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Find The Best Cooling System For Your Data Center

Plan Ahead & Know Your Environment So You're Ready To Evaluate The Options

Data centers run more efficiently and reliably with the proper temperature, and uptime is everything. Having the right cooling equipment is essential. Here are things to keep in mind as you're looking for the best cooling system for your data center.

✔ Plan, Plan, Plan

"Probably the most frequent mistake made by owners purchasing equipment is not knowing the load. In some cases they overestimate the load, requiring too much cooling equipment, which causes cost and operational problems. On the other side of the spectrum, underestimating load results in hot spots or worse," says John W. Martin, marketing manager at Data Aire (800/347-2473; www.dataaire.com). Get a qualified mechanical engineer with data center experience involved early in the process to ensure you get the size and type of equipment to meet your requirements, he says.

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says you need a strategy. "Establish a cooling methodology for your data center. Raised floor or no raised floor? Hot aisle/cold aisle? Containment? Perimeter cooling or localized cooling? A combination of methods?"

Along with that, you need to understand the total investment and what you need for the cooling equipment. "For example," Dickson says, "liquid cooling using chilled water is extremely efficient, but if you do not have access to a chiller or a budget to purchase one, this is not a good option."

Dickson says you'll also need to know what type of maintenance is required for the equipment, what warranty comes with the equipment, and whether you can purchase a service agreement.

✔ Ensure The Unit Can Keep Up With Demand

Make sure the unit you want is designed for 24/7 cooling and can maintain the temperature you require, says Mike Paulson, president of AmeriCool (800/680-0725; www.americoolinc.com). Particularly with portable air conditioners, he says, a common mistake is purchasing a unit that is not designed for commercial applications and environments. "With most data center managers wanting their rooms kept at 68 degrees, it is important to find a unit that will cool below 68 degrees and run 24/7," he says.

Dickson says the cooling equipment needs to be able to scale. "Think about not only what is in the room now, but what you plan to add or think you might add over the next three to five years . . . You don't want to have to do a total rebuild or buy a new CRAC/H unit," she says.

✔ Decide Between Portable & Permanent

Weigh the pros and cons of portable and permanent air conditioning systems, says Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com). "The installed cost of a portable cooler can be dramatically lower," he says, as a permanent system often entails at least some construction and installation costs. Plus, maintenance is also simpler with portable systems.

When purchasing a portable unit, Michel says, consult with your equipment supplier to make sure you get a unit that will handle the total heat load. "It is actually not a bad idea to oversize portable equipment slightly."

✔ Don't Forget About Airflow

"A great deal of money is thrown away on cold air that just doesn't reach the equipment," says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Data Aire's Martin agrees, adding, "The most important issue in data center cooling is airflow management, starting with hot aisle/cold aisle, blanking panels, and sufficient room under the floor to allow for air distribution." If you can add filler panels and other add-ons to your cabinets and racks, then you can direct cool air to where it's needed." P

Key Terms

British Thermal Units (BTUs)
Used to measure the amount of energy required to heat a liquid such as water. In the context of cooling equipment, BTUs are listed as a given rating per hour.

cooling capacity factor (CCF)
The ratio of total installed nameplate capacity to critical load. This ratio should be about 1.2, or 120%.

power usage effectiveness (PUE)
A technique used to help enterprises measure how much of their total data center energy usage is going toward IT and computing equipment.

Buyers' Checklist

- ✔ How many BTUs do you need to keep your equipment at the appropriate temperature?
- ✔ Do you really need the additional cooling equipment?
- ✔ Do you need a closed- or open-loop system?
- ✔ Where will the cooling equipment be located?
- ✔ How much of a concern is noise output?

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Unmatched Visibility At Layer 7

New Niagara 5010DPI Traffic Distribution & Load Balancing System Is Just One Part Of An Extensive Line Of Network Monitoring Products From Interface Masters

Voice. Video. Website requests. Skype, YouTube, and Facebook traffic. It all adds up to creating quite a challenge for enterprise networks, regardless of the number of employees they're trying to serve.

These demands, which are surely bound to increase as new bandwidth-sapping applications arrive and enterprises grow, require an effective, efficient way to distribute traffic among network monitoring, security, and recording tools. The Niagara 5010DPI from Interface Masters accomplishes the task, combining both PacketMaster load balancing and Layer 7 application identification capabilities.

The Path To 40Gb & Beyond

With bandwidth and network speeds increasing to 40Gb and rapidly approaching 100Gb, the Niagara 5010DPI can keep pace with up to 160Gbps of throughput, providing a monitoring system that addresses security and applications such as IPS, IDS, event and traffic recording, and network performance.

The 5010DPI's 24 bidirectional ports support 1Gb or 10Gb Ethernet, with the possibility for 40Gb in the future, says Matthew Butrimovitz, marketing manager. The ports support SFP and SFP+, including multimode, single mode, and extended mode fiber.

The system's Layer 7 load balancing capabilities distinguish essential traffic such as VoIP or website requests from what might be less essential traffic such as Skype, YouTube, BitTorrent, or Facebook, ensuring your network monitoring tools can better handle traffic. Similar to other PacketMaster systems from Interface Masters, the 5010DPI also supports Layer 2 to 4 traffic for mirroring to multiple ports and aggregation of multiple ports to a single port. It's able to do all of this at wire speed with no packet loss, Butrimovitz says.

Most existing packet manipulation systems can only handle packets up to Layer 4 with no tunnel capabilities and only 3,000 limited filters, Butrimovitz says.

The Niagara 5010DPI's deep packet inspection with sophisticated protocol identification capabilities and an extensive filtering engine support up to 50,000 complex filters on IP traffic and Layer 2, 3, 4, and 7 while handling tunnels, and you can customize keys for distribution.

The 5010DPI's 2U telco-grade chassis comes with dual hot-pluggable power supplies and replaceable fans, plus it's easily upgradable to higher speeds to keep up with higher-rate networks. The system comes with a powerful and full-featured software suite. The software can be managed remotely via the management or console port, with an extensive Web-based GUI for full control of configuration, setup, and statistics retrieval.

Networking Products For Any Need

The Niagara 5010DPI is the latest industry-first from Interface Masters, which provides a range of products in the high-speed networking and network monitoring markets. All of Interface Masters' products are made in the United States in San Jose, Calif., close to the company's headquarters.

The company's products work to provide an affordable upgrade path for enterprises moving to 40Gb networks. The Niagara 2831 and 2841 40Gb bypass switches, for example, include extensive active and passive bypass functionalities, eliminating single points of failure. The Niagara 4330-8X combines 30 40Gb ports and 2.56TBps of throughput into a 1U system. All three products can support 1 Gigabit and 10Gb appliances such as IPS and IDS, data loss prevention, WAN acceleration, and other traffic monitoring tools so enterprises can upgrade to new 40Gb appliances as time and budgets permit.

The company shows no signs of slowing down. "As a leading pioneer of PacketMaster technology, we are proud to be releasing bleeding-edge product offerings for the monitoring market," says Aaron Nankin, senior sales and marketing manager. P

Interface Masters Niagara 5010DPI

(408) 441-9341 ext. 147
www.interfacemasters.com

Combines both PacketMaster load balancing and Layer 7 application identification, providing a monitoring system that addresses security and applications such as IPS, IDS, event and traffic recording, and network performance.

- 24 ports support 1Gb or 10Gb Ethernet
- Application identification capabilities
- Ability to configure up to 50,000 filters
- Traffic distribution options based on MPLS, MAC, VLAN, and more

Interface Masters TECHNOLOGIES
Innovative Network Solutions

CASE STUDY

Pioneers In Green Cooling

Coolerado Helps Web Hosting Company Save 80% On The Energy It Spends Cooling Its Data Centers

AISO.net's mission is to be the most reliable and responsible green Web hosting company on the planet. That may sound like a tall order, but for 17 years, the company has been living up to its mission.

AISO.net pioneered the use of onsite solar panels to power its data center. Its use of virtualization reduces the company's energy consumption by 80%. Plus, its physical footprint is about a fifth the size of comparable data center providers.

So when it came time to replace the company's defunct air conditioner, Phil Nail, AISO.net's chief technology officer, wanted to find an energy-efficient option that followed suit with the company's other green initiatives. That's when he heard about an energy-efficient air-conditioning company from Colorado.

Unique Features

The Coolerado units have a number of unique features that set them apart from traditional air conditioners. Instead of using pumps, compressors, or chemical refrigerants that deplete the ozone layer or contribute to global warming, they use an indirect evaporative cooling technology that runs fresh outside air through air filters and then through a heat and mass exchanger (HMX). This unique process delivers

cool air using one-tenth of the energy of typical air conditioners. The Coolerado units are so quiet that they can be installed inside the facility.

AISO.net's previous CRAC unit had one major downfall—it was unreliable and down much of the time. Because the Coolerado units don't rely on costly pumps and compressors, there are fewer parts to maintain or break down.

AISO.net replaced its existing CRAC unit with three powerful and low-profile Coolerado C60 HMX air-conditioning units. The HMX conditions air using indirect and staged evaporative cooling. Indirect means that the moisture used to remove heat from the air never touches the product air that is eventually introduced into the cooled space (leaving the delivered air humidity-neutral, as compared to ambient conditions). Staged means that the air is cooled in 21 stages as opposed to all at once, which enables Coolerado to deliver lower temperatures than its competitors. The net result is a cooling product that provides conditioned, humidity-neutral air and consumes only enough energy to power a fan.

"The Coolerado units do exactly what they're supposed to do. They've been absolutely perfect," Nail says.

Reduce Energy Needs

In addition to requiring little maintenance—which consists of routinely changing the filters that trap particles blown in from the dusty southern California desert where AISO.net is headquartered—the Coolerado units provide a significant savings in energy costs.

"We probably use only 300 watts of power. That saves us easily $2,000 or more a month by using Coolerado vs. a regular AC. And, since we're off the grid, that just allows us to put in more equipment without expanding our energy needs," Nail says.

The company also found a way to reduce its use of water by using a rainwater collection system on its roof that stores more than 10,000 gallons of water. The rainwater collected is used for Coolerado's unique indirect evaporative cooling process and for watering its green roof during dry periods.

How have all these energy-efficient initiatives impacted business? Since 1997, AISO.net has been profitable, debt-free, and grown an average of 20% each year.

"Coolerado air conditioners save us on energy costs and allow us to maximize our technology density while not compromising on performance for our customers," Nail says. "Most companies expand their footprint as they grow. AISO.net's philosophy is just the opposite—we reduce our footprint as we grow." P

Coolerado

Manufactures a line of HMX, or Heat Mass Exchange, air-conditioning units built on an evaporative cooling technology that uses up to 90% less energy while cleaning and filtering outdoor air.

(303) 375-0878 | www.coolerado.com

Coolerado

FEATURED PRODUCT

A Storage Solution For Any Need

Barracuda Has You Covered Whether It's Backup, Archiving, Or Simple Copying & Sharing

Today's enterprise storage environments are complex, with different storage needs each demanding a different solution.

You need a backup solution for quick recovery in the event of a disaster, email archiving to ensure emails can be retrieved and reproduced in the event of a discovery process, and a place for employees to be able to easily back up or copy and share documents with others, regardless of their location. Barracuda's range of storage products covers those needs and others.

Barracuda Message Archiver

Barracuda Message Archiver offers a complete, affordable solution for enterprises facing increased restrictions when it comes to legal and regulatory compliance.

The plug-and-play Archiver appliance indexes and stores all sent and received emails in one central, tamper-proof location. In the event of a discovery request from human resources or legal, you can easily find what you need.

In addition to helping comply with PCI DSS, HIPAA, FINRA, and other regulations, the Message Archiver appliance lets you move email storage and user traffic off your primary mail server, so you'll benefit from better overall efficiency in your email servers and storage. Plus, Barracuda Message Archiver deduplicates and compresses email while stubbing attachments an average of 85% before storing the messages.

Archiver offers role-based access for administrators and auditors, along with audit logs that provide clear visibility into search activity. An Exchange add-in lets users access their own archived emails through Outlook.

Administrators can define retention policies to ensure different types of information are kept for the time needed to remain in compliance while freeing up memory by removing messages that are no longer needed.

Barracuda Backup Service

Barracuda Backup Service provides a simpler, more cost-effective way to back up your servers for disaster recovery.

With the server backup service, in the event of an outage, data corruption, or other disaster, you'll have the software, configuration, and data you need to restore your server in record time. A LiveBoot for VMware feature lets you boot a virtual machine directly from the backup server's deduplicated backup storage, so you can get back up and

running even more quickly. And you won't have to rely on removable media such as tapes, which take considerable time and effort not to mention the chance of them being lost, stolen, or damaged.

Barracuda Backup Service includes a plug-and-play appliance with either cloud storage or private cloud disc-based replication to store data in multiple offsite locations. Backups and restores occur at LAN speed, and deduplication and compression features reduce your total backup storage footprint up to 50 times when compared to other traditional backup methods. Your data is secure using AES 256-bit encryption at all times.

Administrators can set policies for backup and retention to help in compliance efforts. A Web-based dashboard offers a quick glance at current backup and system status while making it easy to find and restore files and view backup reports. For organizations with several data center locations, Barracuda Backup provides convenient central management of backups at all locations.

A risk-free 30-day trial is available for both Barracuda Backup and Barracuda Message Archiver.

Copy By Barracuda

With enterprise employees literally working from anywhere across the globe, they need a way to quickly back up or share files or folders. Copy can serve as a "backup for your backup" or as a standalone backup product.

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No matter your backup need, whether it's full-scale email archiving or backup for individual users, Barracuda has the product to meet the challenge. P

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FEATURED PRODUCT

Maintain The Ideal Temperature

Geist Opengate Containment System Uses Sensors, Chimneys & Enclosures To Provide An Intelligent Cooling Solution For Your Data Center

How do you solve cooling problems in your data center? Do you invest in portable cooling? Propose having a contractor install additional CRAC units? Rearrange equipment in an attempt to get by?

"Traditionally, cooling problems get addressed with more CRAC units as a band-aid fix, which results in a situation where the data center is vastly overcooled," says Bryce Kleen, product manager at Geist. "It's like adding a window air-conditioning unit to your new house to keep the temperature cool because it gets hot when you leave all of your doors and windows open." This is very expensive, and you can end up wasting precious money and resources.

An intelligent containment solution, such as the Geist Opengate containment system, is the best option to manage data center cooling and airflow without overcooling.

Maximize Performance

Opengate by Geist is designed to maximize the performance of your cooling system by delivering the hottest return air to the CRAC while only requiring a modest level of cold air at the start, Kleen says.

It does so by providing "intelligent containment," he says. This two-step process

OPENGATE BY GEIST

focuses on containing heat in the back of the cabinet and then exhausting it through a chimney directly to a CRAC unit, ensuring data center equipment stays at the ideal temperature. In fact, IT intake air is stabilized within a few degrees of the supply air temperature at all points in the data center.

The Opengate system includes expertly manufactured chimneys and conversion kits that seal cabinets at the rear and sides and work to channel hot air directly to the hot air return and minimize hot air mixing.

But unlike simple passive chimney systems, Geist's Opengate incorporates smart fans to regulate the internal pressure of the cabinet, Kleen says. The fans speed up or slow down based on the information they receive from pressure and temperature sensors both inside and outside the cabinet.

"It's a process that successfully quarantines all IT exhaust, so data centers can optimize their cooling supply air temperature," he says. "In fact, by containing the hot air and keeping it from mixing with the cold air, data centers can save up to 40% on cooling energy."

Works With Your Existing Setup

Opengate can work with virtually any type of cabinet setup, whether it's a single cabinet or row of cabinets, cabinets that are partially full or ones that have very high densities.

With Geist's vast library of cabinet-specific installation kits, including cabinet tops, door-blocking kits, and mounting hardware, Opengate is available for virtually every new or existing cabinet model or configuration. And Geist design engineers can deliver a custom solution, if needed, ensuring Opengate can be retrofitted to work in any existing data center, Kleen says, regardless of size or the cold air process currently in use.

The Opengate system's capacity automatically scales as loads are added or removed. High-density loads can be combined, and multiple systems can work together to share cabinet loads. If there's a power failure, the Geist cooling unit can continue to operate using power provided by its PDU.

The software included with Opengate automatically monitors and reports environmental conditions, and you can receive automatic email or SNMP notifications of system threshold breaches. The Opengate system provides a real-time airflow consumption measurement at the rack level. Coupled with Geist's Environet DCIM solution, data centers now have a means to accurately sequence CRAC units or scale back cooling horsepower to match the ever-changing heat loads of today's dynamic data centers. P

Opengate by Geist

(800) 432-3219
www.geistglobal.com

An active containment system that focuses on containing heat and expelling heat directly to CRAC units, maintaining the ideal temperature for your data center, regardless of its size or density.

GEIST

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Computer Peripheral Solutions, LLC manufactures numerous products that are targeted towards very economical problem resolutions and increasing efficiencies within various niches in today's networking, such as local and remote controlled power devices, remote switching, telephone line sharing and dial security. They can be used in a variety of applications such as kiosks, monitoring equipment, security systems, observatories and lab/test centers, to name a few. Most units offer several different types of control, for example: USB, Wireless, ring count, touch-tone, cell and web. The products range from a single box to the more flexible and scalable modular systems.

The U-X3 (pictured above) is an economical, but extremely flexible AC power control device that can be used to control the AC power to three different devices via Ethernet, USB or Wireless.

The products were developed as a result of specific user requirements, others as OEM products while still others evolved solely on speculation. This has resulted in a rather diverse product line and has also served to expand the company's technology base.

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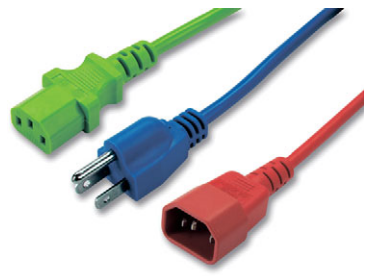

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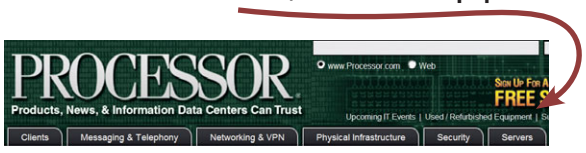

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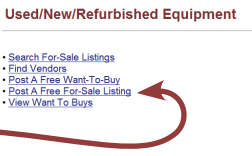

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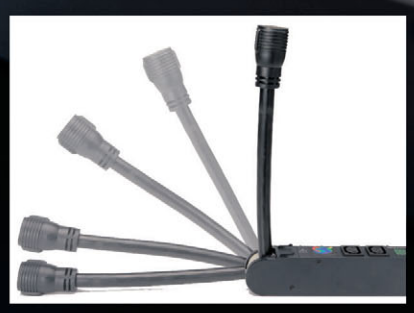

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- Temperature and Humidity Monitoring
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- Locking Outlets
- Branch Circuit Protection
- Button Mounting

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208V 3PH 30A Smart PIPS PDU w/ cir bkrs - PDU

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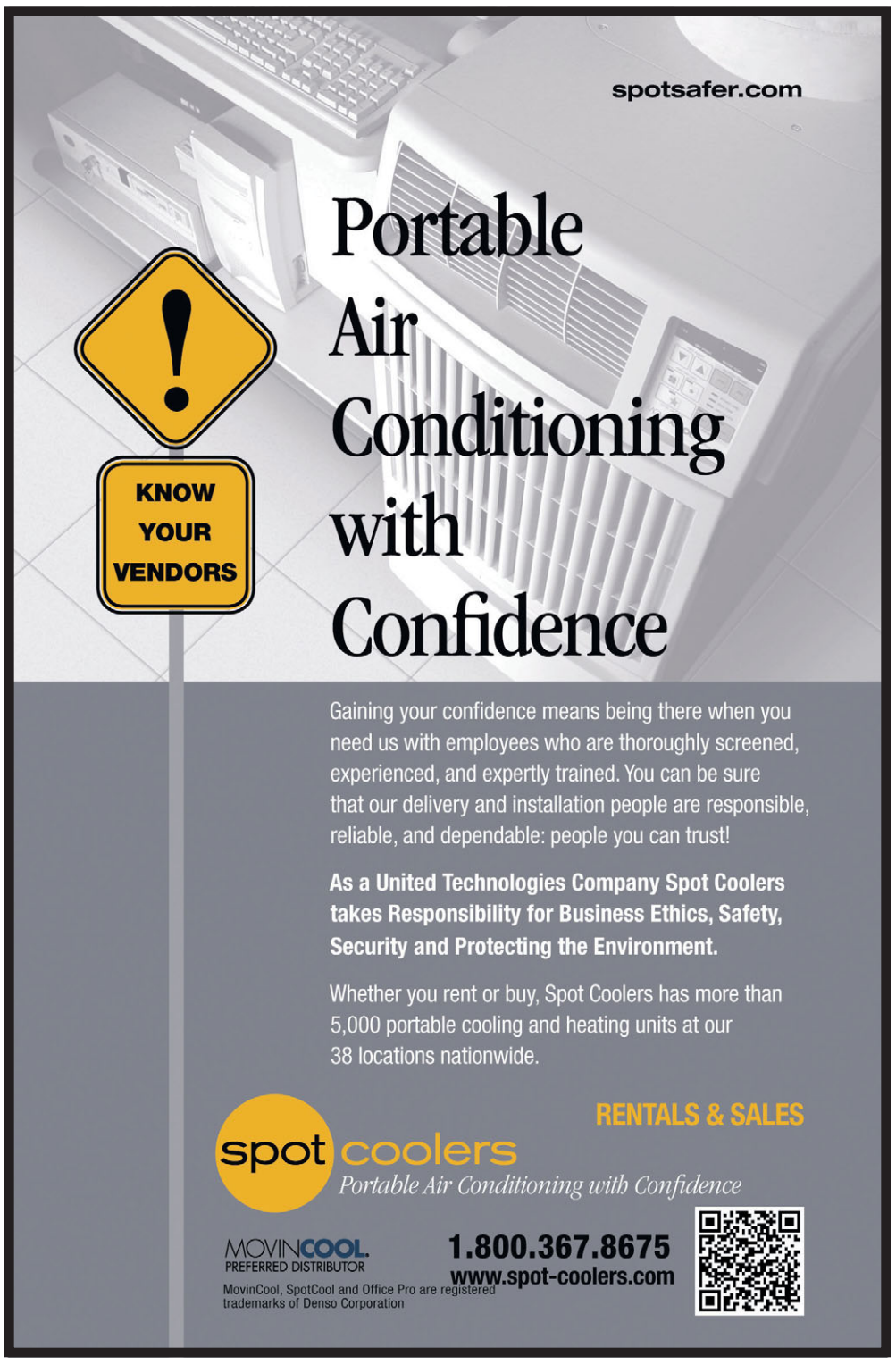
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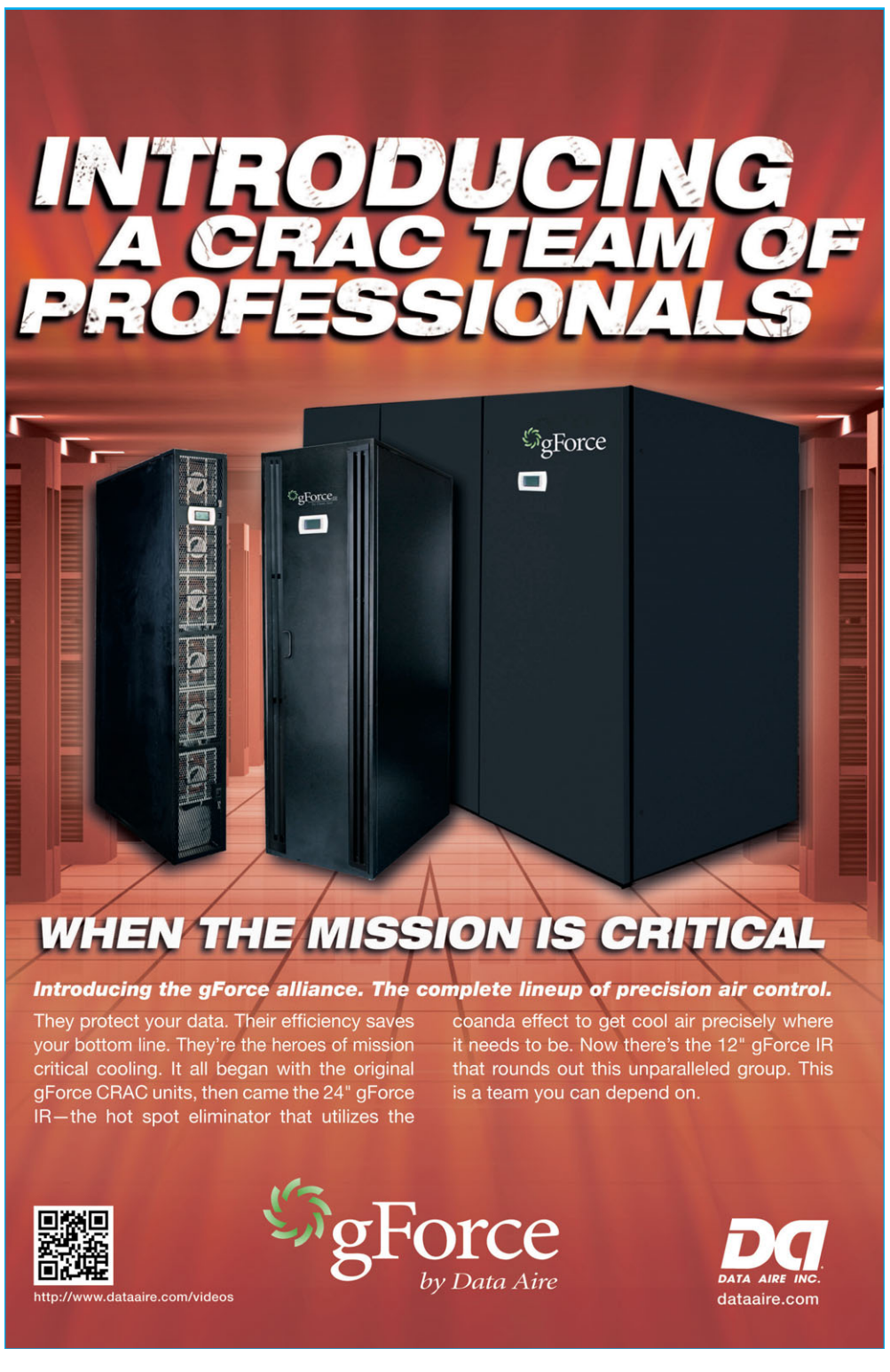
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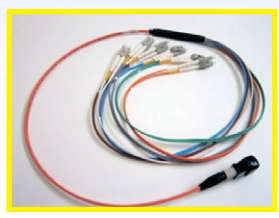

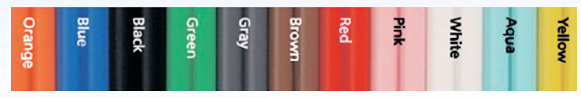

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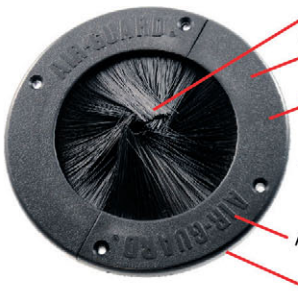

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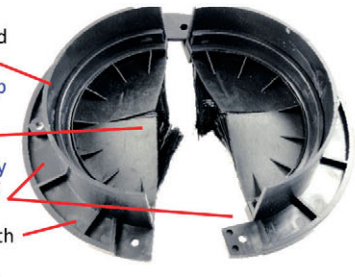

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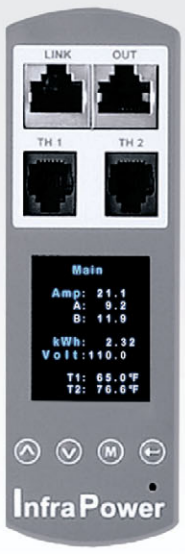

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United States Among Most Innovative Nations

More signs of economic recovery are springing up, with spending on research and development surpassing 2008 levels in most countries, according to the Global Innovation Index 2013. Report authors note that this year's index sheds light on the local dynamics of innovation. "For national-level policy makers seeking to support innovation, realizing the full potential of innovation in their own backyards is often a more promising approach than trying to emulate successful innovation models elsewhere," says World Intellectual Property Organization Director General Francis Gurry.

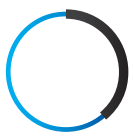
The index, which is published by Cornell University, the INSEAD graduate business school, and the World Intellectual Property Organization, studied 142 economies around the world. Here are the top 10:

Country	2013 Ranking	2012 Ranking
Switzerland	1	1
Sweden	2	2
United Kingdom	3	5
Netherlands	4	6
United States	5	10
Finland	6	4
Hong Kong	7	8
Singapore	8	3
Denmark	9	7
Ireland	10	9

IT Executives More Confident In Spending Plans

Organizations are investing in IT again, and IT executives are more confident in their spending plans and are hopeful of being able to augment their spending. Those are among the findings of the annual Computer Economics "IT Spending And Staffing Benchmarks" study.

Other major findings include:



- 61% of organizations are increasing their operational budgets.

- IT spending will be up 2.3% this year (2012 spending was up 2.2%).

- 20% of IT executives expect their budgets to be reduced (last year, 31% of executives expected budget cuts).

- 40% of executives feel their IT budgets are adequate to meet the needs of their organizations, indicating increased pressure to be spending more.

- Average IT spending is $8,000 per user.

Shift To Cloud Office Systems Could Take A While

Despite the hype surrounding the move to cloud email and office systems, relatively few businesses have made the move. Recent research from Gartner shows that about 50 million enterprise users are on a cloud office system—that equates to just 8% of all office system users. Gartner expects that to start changing in the first half of 2015, though, and penetration will reach 33% by 2017. "Despite the hype surrounding migration to the cloud, big differences in movement rates continue, depending on an organization's size, industry, geography, and specific requirements," says Tom Austin, vice president and Gartner Fellow. Gartner also expects a considerable change in how users are accessing cloud office systems. The research group notes that, in 2007, when the cloud office market first appeared, users accessed those office systems with just one device. Today, the average user now has up to four devices (typically a mobile phone, tablet, personal PC, and enterprise PC) accessing the office system.

LTE Growth Starting To Show Impact

The broad shift toward LTE is now beginning to show an effect on the 2G, 3G, and WiMAX markets, according to a new report from Infonetics Research. But in the meantime, the market as a whole is down. For the first quarter, the worldwide 2G/3G/4G mobile infrastructure market was $9.8 billion, down 9% from the previous quarter and 2% from a year ago. The WiMAX market dropped 42% from the previous quarter. For comparison, LTE-only revenue totaled $2.7 billion, up 21% from the previous quarter and 108% from a year ago. Richard Webb, directing analyst for microwave and carrier Wi-Fi at Infonetics, says Infonetics expects LTE will grow at a 16% CAGR over the five years from 2012 to 2017.

Mobile Users Taking Data Traffic To Wi-Fi

As the number of readily available Wi-Fi hotspots and small cell networks continues to climb, people are increasingly making use of these wireless connections with their mobile phones, tablets, and other devices. In fact, nearly 50% of data traffic from these devices will flow over Wi-Fi and small cell network connections this year, according to Juniper Research. That amounts to 9,000 petabytes, or more than 9.4 million gigabytes, and Juniper expects that annual usage will grow tenfold by 2017. Wireless carriers are responding, Juniper says, by offering their own Wi-Fi solutions and introducing 4G LTE (long term evolution) service, in order to stave off lost revenue from off-network data usage.

Worldwide IT Spending Up, Driven By Software Investments . . .

Worldwide IT spending will be up 2% this year to total $3.7 trillion. Gartner's latest prediction is down slightly from the 4.1% growth it expected last

quarter, caused partially by recent fluctuations in U.S. dollar exchange rates. A drop in PC sales, with little recovery expected through at least the remainder of this year, caused Gartner to lower its forecast for spending on devices from a predicted 7.9% growth last quarter to 2.8% growth this quarter. The biggest growth will be in spending on enterprise software, which Gartner expects to be up 6.4% this year, driven in part by growth in the CRM market. Other top areas of spending include IT services (up 2.2% this year), data center systems (up 2.1%), and telecom services (up 0.9%).

. . . But Government IT Spending Will Be Relatively Flat This Year

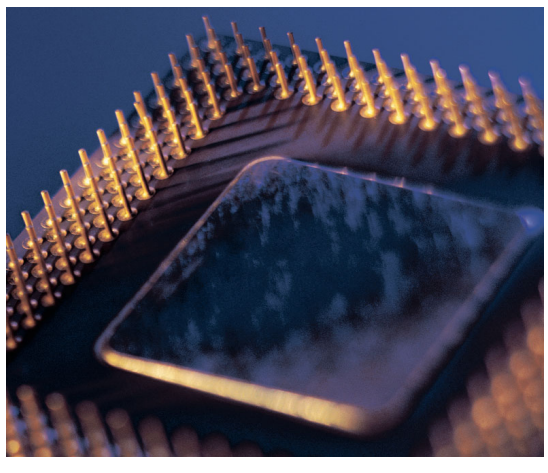
Government agencies continue to struggle with the weak economy, causing worldwide IT spending by government organizations to decrease by 0.1% this year, according to research firm Gartner. Mobile technologies, IT modernization, and cloud computing are the top three areas of spending, Gartner notes. "Cloud computing, in particular, continues to increase compared with prior years, driven by economic conditions and a shift from capital expenditure to operational expenditure, as well as potentially more important factors such as faster deployment and reduced risk," says Christine Arcaris, research director at Gartner. She says that data center consolidation ranks lower on the list of priorities than in previous years, possibly indicating resistance. In terms of mobile technologies, 52% of government organizations allow employees to bring their own smartphones to work.

Growth Forecasted Across Gamut Of PC Categories

Canalys has released its worldwide total client PC shipments forecast, which identifies tablets as well as traditional desktop PCs and laptops as part of the PC category. Sentiments from Canalys fall in line with those of other research firms in predicting that tablets will dominate the market in the coming years. Among many indicators of tablet market strength, Canalys points out that the market doubled in the first quarter of this year and that shipment totals continue to increase. Noting that many traditional PC makers have released tablets, Pin-Chen Tang, research analyst with Canalys, says, "Low-priced tablets will not be lucrative, but it is necessary to compete or a vendor will simply lose relevance and scale."

Dual-Core, Quad-Core & The Smartphone Market

If Berg Insight's forecast is correct, almost all of the about 1.5 billion smartphones that hit the market in 2017 will use at least a dual-core processor, and most will use a quad-core processor. Introduced to smartphones in 2011, dual-core processors offered greatly advanced



computing power, essentially providing smartphones with the same processing power found in desktop PCs just a few years earlier. Introduced to smartphones in 2012, quad-core processors offer further power. As quad-core now represents the leading edge, even low-cost smartphones will begin using dual-core processors. According to Berg Insight, both high-end ($500-plus) and low-end ($130 and less) smartphones accounted for most growth in this category in 2012.

Disk Storage Market Growth Continues, But At Slower Rate . . .

Revenues in the external controller-based disk storage market were up for the 14th consecutive quarter, according to research firm Gartner. But the relatively minuscule 0.6% increase for the first quarter of this year was the slowest year-over-year growth rate since the fourth quarter of 2009, says Roger Cox, research vice president at Gartner. The North America region had the slowest growth rate, at 0.2%, primarily caused by the deadlock between the executive and legislative branches of government, Gartner notes. Sales in both the Asia/Pacific and Europe, Middle East, and Africa regions were up 1.7%, while Japan saw growth of 5.7% and Latin America revenues were up 23.3%.

. . . With Spending In Emerging Markets Setting The Pace

Spending on enterprise storage in emerging markets such as Asia/Pacific, the Middle East, and Africa outpaces spending in more mature regions. That shift, according to research from IDC, means that Asia/Pacific will unseat the struggling Western Europe region by 2015. IDC notes that customers in emerging markets are less likely to be tied to a legacy infrastructure and more open to new offerings from local and regional suppliers and cloud service providers. IDC expects end-user spending on storage to grow at a modest 4.1% CAGR between 2012 and 2017 and will reach $42.5 billion by 2017. Digital media and content, data protection, and archiving are the major drivers behind demand for more storage capacity. More than 102 exabytes of external and 36 exabytes of internal storage system capacity will be shipped in 2017, IDC reports. That's up from the 20 exabytes of external and 8 exabytes of internal storage shipped last year.

Venture Capital Investments Down

The second quarter was not a good one for venture capital, according to the latest report from Thomson Reuters and the National Venture Capital Association. During the quarter, firms raised $2.9 billion, down 33% from the first quarter, while the number of funds remained the same at 44. The dollar amount is down 54% from a year ago, marking the lowest quarter since the third quarter 2011. Mark Heesen, president of the NVCA, says the decline shows both a consolidation of the venture capital industry and a contraction in fund size. "Many long-standing, pedigree venture firms are heeding the guidance from limited partners and raising smaller, more agile funds. Consequently, dollar values of capital under management are declining from historical levels."

SIX QUICK TIPS

A Look Inside Green Grid Metrics

Use The Measurements To Improve Efficiency & Minimize Environmental Impact

The Green Grid is known for providing helpful metrics that center around improving the overall efficiency of data center facilities. Some common examples are power usage effectiveness (PUE) and water usage effectiveness (WUE), which are becoming more popular with data centers. But from The Green Grid's perspective, companies shouldn't stop with these two metrics and call it good, because there's so much more that can be done.

"What The Green Grid is doing now is trying to get one step away from just energy and saying, 'If you solve the efficiency equation for energy in your data center, why not focus on other things as well?'" says David Cappuccio, vice president and chief of research at Gartner. The Green Grid has created new metrics and put a stronger focus on existing ones to help companies strive for the highest possible efficiency.

✔ Green Energy Coefficient

One of the simplest, but most important metrics The Green Grid offers is the green energy coefficient (GEC), which is "a percentage of energy coming into the facility that is green," says Harry Handlin, vice chairman of The Green Grid's technical committee. There are multiple examples of situations that GEC will take into consideration, including "onsite renewables, contracts for renewable power that you have with a utility company, or a contract that you have with a wind farm," Handlin says. The goal of GEC is to give you a solid figure for how much green energy you are actually using. This is a great metric for those looking to see how efficient their existing green tech implementations are and for companies that are just starting out and want to find ways to do even more.

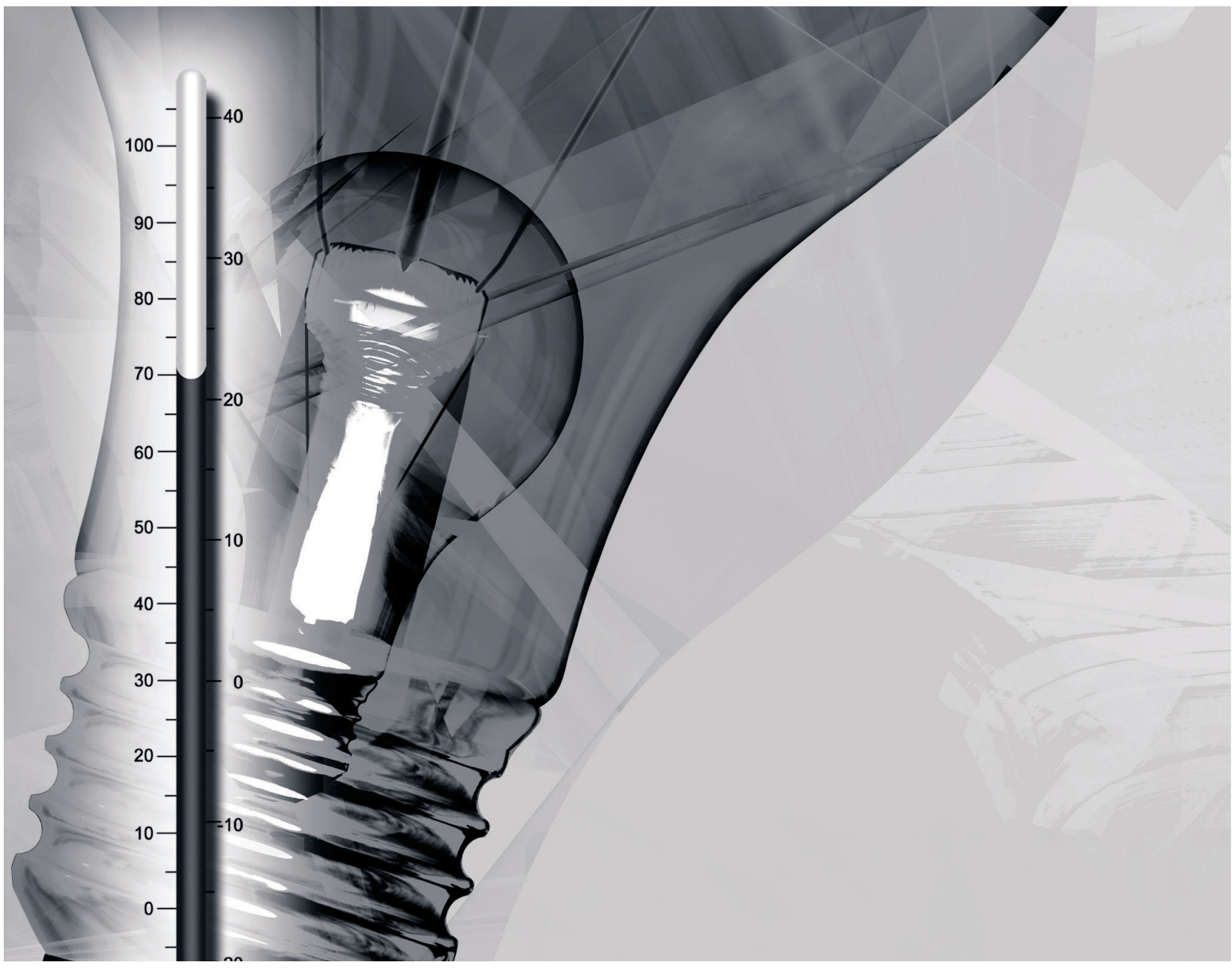
✔ Energy Reuse Factor

Energy reuse factor (ERF) is meant for organizations that generate their own power onsite and have excess energy the data center doesn't utilize. "The energy reuse factor is a metric that defines the portion of energy that's exported for reuse outside of the data center," Handlin says. "For instance, if you have a data center that's generating its own power, and in some parts of the world they will have natural gas generators, and if you can recover some of that heat and sell it to an adjacent facility, that energy is actually reused."

ERF isn't a fit for all companies, as some smaller organizations simply don't have the resources to generate their own power. But Handlin says the technology should continue to improve and more companies will be able to implement solutions that recover waste energy, which can then be sold to other facilities or simply used in a more efficient manner. "What do you do rather than just dissipate heat into the atmosphere and reuse it?," Handlin asks. "That's going to be a bigger and bigger topic as we get more mature in our industry."

✔ Carbon Usage Effectiveness

Carbon usage effectiveness (CUE) is similar to PUE and WUE in that it gives



the owner an "assessment of the total greenhouse gas emissions of the data center relative to the IT energy consumption," Handlin says. This metric is considered absolutely crucial in Europe, Asia, and Australia, where many companies are heavily regulated to minimize their carbon footprints. Because the United States lags when it comes to carbon-based issues, The Green Grid is putting a stronger focus on CUE and trying to help companies understand its importance.

Handlin says companies can better implement CUE-based initiatives by integrating them with existing performance metrics. "We know of several data centers that use PUE as a metric, and their data center operator is charged with improving his PUE by a certain amount year over year, and that's just part of his job," he says.

"We'd love to see that same type of thought process applied to these metrics. A data center operator has to take certain actions, and if one of his goals and objectives as far as his performance metric is to reduce his carbon footprint, CUE would be a great tool for him to benchmark where he is and how his data center is improving over time."

Some companies are tied to their carbon usage based on their geographic region, and businesses in some areas are "blocked in by local regulations and have to secure power from a local facility," some of which are coal fire plants, Handlin says. For those companies, Handlin says they simply need to do their best and determine whether they can contract for renewable green energy sources with local providers to supplement at least a portion of their energy.

✔ Additional Green Grid Resources

The Green Grid provides quite a few metrics for companies to take advantage of, and there is already proof that these measurements are truly beneficial for data centers in any industry. PUE is helping companies understand how they use the energy they bring into their data centers and ways to improve the efficiency. WUE is helping companies find "different ways to cool equipment without wasting all that water," Gartner's Cappuccio says, adding that the figure can be "literally hundreds of millions of gallons a year for a good-sized data center."

But The Green Grid doesn't begin and end with metrics and measurements. The group also aims to educate companies on what changes they can make to help them save money, but also minimize their impact on the environment, Handlin says.

"We try to give more information, metrics, and tools from The Green Grid website for things that can be done to improve the efficiency and environmental sustainability, and these metrics are just another example," Handlin says. "We'll continue to work on these, and hopefully we'll have more in the future" P

✔ Follow The Data Center Maturity Model

One of the only ways to determine whether your data center is correctly using The Green Grid metrics is to compare yourself against other companies and consider your place in the data center maturity model. "It's an important tool for a data center owner or operator to establish a benchmark for where his data center is relative to the industry best practices today and also creating a road map going to the future," says Harry Handlin, vice chairman of The Green Grid's technical committee. "It does a great job of looking at all aspects of your data center, not only from a facilities standpoint, but also from an IT standpoint. It really does a good job of benchmarking where you are and is a good tool to look at a long-term plan for improving the efficiency and sustainability."

✔ Focus On Localized Benefits

According to David Cappuccio, vice president and chief of research at Gartner, countries in Europe or Asia can look at something like carbon usage effectiveness (CUE) and "calculate the potential tax in their head." Because they are more regulated in that sense than the United States, they are more likely to cut down on emissions.

With North American companies, Cappuccio takes a different approach and focuses on benefits that better fit the North American mindset. "What I'm talking to North American customers about is, if you focus on energy consumption and energy savings, what you're doing is reducing operating costs," Cappuccio says. "And the secondary benefit is that you're also improving social responsibility [and] carbon footprints, and it's good for everybody. It's a win-win. That argument seems to be taking hold in North America. A lot of folks are realizing that by doing some simple things, they can actually improve those indexes, reduce costs, and make IT itself a more efficient organization."

BONUS TIPS:

✔ Be More Aware Of Physical Space

If you want to improve your data center's efficiency and hit the optimal targets of The Green Grid's metrics, then you should "focus on space efficiency, not only energy," says David Cappuccio, vice president and chief of research at Gartner. "How do I get more compute capability out of my existing footprint rather than building ever larger and larger data centers?" If you can answer that question, you may see your overall efficiency improve significantly.

✔ Consider Alternative Cooling Methods

Cappuccio says one way to improve your PUE is to consider liquid-based cooling. "Water is 1,600 times more efficient at cooling than air is," he says. "It's more expensive to implement, but there are long-term significant savings." Most companies use a refrigerant instead of water, so you can also improve your WUE at the same time.

SIX QUICK TIPS

Understand Your Options For Uninterruptible Power

To Find The Best Solution, Start By Understanding Your Environment

Unless you're well-versed in wattage, batteries, dirty power, and other aspects of power, buying a new UPS system can be a confusing endeavor. What options are available? How do you know which is best for your environment? The following advice and tips aim to ease the task and ensure you get the best solution.

✔ Determine & Prioritize Workloads

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says most relevant UPS technologies are readily accessible in terms of capacity and pricing. Applicable technologies include online systems, automatic voltage regulation, and remote management, which are available in various systems often at a "reasonable price when considering the functionality," she says.

No matter the UPS solution, properly sizing a system is essential. Although determining power capacity, runtimes, and growth can be confusing, Viars says, most major UPS manufacturers provide tools to help determine the appropriate parts and accessories required.

Clive Longbottom, service director at Quocirca, says because UPS solutions can be expensive, companies should prioritize what they want a solution to do. If there's no need to keep all equipment running upon failure, for example, buying a small UPS can save capital, resources, and running costs. If this is a requirement, determine the expected load growth over the UPS' life and if you'll finance that growth upfront or incrementally, he says.

Darin Stahl, principal consulting analyst at Info-Tech Research Group, says it's important to identify critical workloads where battery power should be directed vs. non-critical servers that you just want to properly shut down after a failure. Knowing this can dramatically change what you'll purchase and the purchasing process, he says. Key is understanding "where I am from a size perspective when I step into the discussion," he says.

✔ Mull Over Modularity

Longbottom says it's vital to consider a UPS system's modularity, which "allows for growth/shrinkage in the data center and failover to another module should any failure occur and load balancing during normal usage." Buying a monolithic system, he says, means you're stuck with it. If the data center workload grows, the company must buy another UPS. If the workload shrinks, you have an over-engineered system that's wasting money.

Stahl says many companies look at UPS purchases with the belief the company will grow not expecting that a situation could arise that requires using colocation, outsourcing, IaaS, or SaaS. "So now you have a much smaller footprint," Stahl says. "If my UPS solution can scale up in a modular fashion, then it stands to reason it can scale down in a modular fashion." If you must shrink power, he says, you don't "want to

have a UPS sitting around being conditioned that you're not using, because it's not neutral. It does cost."

✔ Understand The Jargon & Available Options

Understanding the jargon and figuring out exactly what's needed is an obstacle many companies face, Longbottom says. In small to midsized enterprises, IT often is left with trying to understand the options, modes, and functions. Thus, IT must "define exactly what it expects from a system and then ask for clarification from suppliers about any function they don't understand and how it applies in real life," he says.

Understanding all the available options can be another obstacle. Viars says small to midsized enterprises will likely focus on line-interactive and online systems. Although online systems provide "a superior level of backup than line-interactive systems," she says, cost differences don't always justify the benefit. "Line-interactive systems are typically suitable for SMEs," she says.

Anu Elizabeth Cherian, senior industry analyst at Frost & Sullivan, says for UPSes of higher kVA, service availability and good warranty services are key to ensuring that future costs incurred on the system are low. Cherian says it's likely you'll encounter highly competitive pricing and a lack of differentiation. In fact, she says, "the differences would be so minimal that they hardly matter, while the key differentiator could be service and warranty offered by the manufacturer."

✔ Monitor & Maintain

Cherian says although smaller companies typically don't spend a lot of time thinking about UPS monitoring, data center monitoring capabilities can add cost but are worth the investment.

Some vendors provide monitoring capabilities, Stahl says, which is worth considering depending on the use case and criticality. "I do want to understand what my energy efficiency is, and the UPS is not neutral," Stahl says. "It's sitting there using power, conditioning battery. I do need to monitor it." More importantly, he says, "I need to understand that it's there."

Longbottom says most systems include their own management, but it's important to make the UPS an integral part of the overall data center. Ensure any included management system works with existing systems, he says, and test the system regularly to ensure it functions when needed.

Depending on the UPS software, Viars says, status monitoring and remote shutdowns may be available. When eying management systems, consider the network size and level of control desired, she says. Also ask for software demos to ensure the software has the capabilities you want. If it doesn't, she says, inquire about the ability to use third-party software that does, she says. P

✔ Service After Repair

Info-Tech Research Group principal consulting analyst Darin Stahl stresses the importance of accounting for service after the sale. "Years two through six, what are the specific terms with the vendor? What are the real costs there?," he asks. Ultimately, companies want to know "how does the vendor help me, and what are they doing within their own processes to reduce the mean time to repair," he says.

"At the end of the day, it's about knowing what happens in year three when this thing crashes? How do I get the parts? Where are they coming from? How soon can I get this thing repaired? Because when it's down, I'm vulnerable."

✔ Consider These Newer Features

There are a few somewhat newer UPS features worth considering. Frost & Sullivan senior industry analyst Anu Elizabeth Cherian says transformerless UPSes are gaining in popularity because they have "manifold benefits and increased energy efficiency as transformers are replaced with solid-state circuits. These systems are best used in the below-300kVA power range and hence are perfect for SMEs."

Quocirca Service Director Clive Longbottom recommends systems with high-efficiency modes. "98% should be the benchmark; watch out for systems still operating at 95% or less, as with energy costs being as they are, such wastage can become a major issue," he says.

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says, "Just like everything else, UPS technology has become more 'green' over the years." Take energy costs into consideration if there's an opportunity to replace an older UPS with a new one.

BONUS TIPS:

✔ Account For Runtimes

After determining proper sizing, Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), recommends pinpointing the backup runtime required to keep equipment powered after a failure. "Runtimes are typically an approximation, as they will vary dependent upon how much equipment you have connected to the UPS," she says. Longer runtimes are usually achieved by incorporating additional battery packs to the system. Keep this in mind "as your network grows, as a runtime of 10 minutes now may become a runtime of five minutes in the future if you begin adding new equipment. Fortunately, extended battery packs can be added into a system as it grows."

✔ Don't Underbuy

A common purchasing mistake is selecting a unit that lacks enough capacity to support the necessary equipment, Viars says. "An IT manager might select a smaller UPS than needed unintentionally due to inaccurate wattage calculations or even intentionally to save money. Unfortunately, too many IT purchases are made based on price," she says.

SIX QUICK TIPS

Server Trends, Technologies Reshape The Industry

Current & Future Developments That Could Change How & What You're Purchasing

Being a successful data center or IT manager requires continuously keeping an eye on future infrastructure needs while tackling present-day responsibilities. This is particularly important in the server market, where managers must be cognizant of looming trends and technologies that could potentially transform current operations. Here is a look at some server trends and technologies now the horizon.

✔ Consolidation & Converged Infrastructures

In recent years, says John Sloan, lead research analyst at Info-Tech Research Group, converged infrastructure and consolidation have been major trends. The model, which Sloan refers to as "layer cake" or a "stacked" model, essentially entails virtualization tying together converged storage, network, and servers (typically blade or rack servers). This model has developed to where vendors now sell it as a product that's moved down to midsized businesses, Sloan says. Simultaneously, however, cloud computing has emerged, but pure-play cloud companies "haven't been building their infrastructures on these converged stacks; they've built more as a scale-out process" via huge server farms, he says.

For larger enterprises seeking to tackle big data, host applications, become SaaS providers, or support large mobile workforces, a stacked model "doesn't really scale well to doing the hyper-scale cloud-type stuff," Sloan says. Thus, the classic converged infrastructure is changing, meaning a "migration of storage back to the servers" and server-side flash PCI cards, in-memory processing, and other technologies, Sloan says. "The role of that big SAN array as sort of the foundation of that converged infrastructure I think is going to change quite a bit in the next couple of years as the primary storage moves back toward the servers," he says.

Greg Schulz, senior advisor at Server and StorageIO, says although blades and virtualization have been around a while and "some even assume they've hit their full market potential," the technologies still hold considerable opportunity, particularly in small to midsized enterprises. "Sure, the low-hanging fruit may have been picked, but there are a lot of other opportunities to go back and revisit those servers or applications that couldn't be consolidated," he says. Though some applications don't lend well to consolidation for security, performance, availability, business, and other purposes, they "might be able to be virtualized on a faster server with fewer multi-tenant neighbors (applications or workloads) on the same server or blade," he says.

✔ Increasing Cores

Dick Csaplar, senior research analyst at Aberdeen Group, says in addition to smaller enterprises being able to now purchase computing power previously reserved for the largest of companies, another notable change regarding servers is the increasing number of cores per CPU. "I believe the current number for multinode CPUs is 15," he says. "I know server vendors are looking

at four-CPU servers to replace the performance of what eight-processor servers used to provide. The increasing number of cores increases the computing power," he says.

New four-processor servers, Csaplar says, are smaller and require less power than old 8-way CPUs, thus "data centers can continue to get smaller and less power hungry server per server. We have automated more business processes and implemented programs like big data, which means the actual size and cost of data centers may not be getting smaller, but the cost of automating any single process has indeed dropped."

✔ Get Smaller

A downside of the scale-out server architectures that cloud providers are leveraging is that the use of multiple commodity servers eventually requires significant space and power and generates considerable heat, Sloan says. Thus, cloud providers especially are exploring new, smaller server form factors and architectures requiring less power but can be densely packed. One approach for this is using microservers, allowing many servers to work in tandem but without huge space requirements.

Currently, Sloan says, microservers are being used in midrange data centers for tasks that require lots of processes but in which each processor isn't doing a whole lot of work, such as supporting a large website where processors serve up scads of Web pages but that's all they do. Sloan says potential uses for microservers will increase as companies look more to applications such as big data. "A lot of big data analytics is architected to not run on big processors but on a farm of smaller processors or smaller servers," he says.

Schulz believes we're "just scratching the surface with microservers." Not all applications or even virtual machines onsite or in a private or public cloud need faster servers, he says. "Some of the current 'software defined' buzz activity is actually overshadowing vs. raising awareness of microservers and micro-blade technologies, of which I'm a big fan," he says.

✔ Look Ahead

Taking a bold look into the future, Schulz says, "virtualization will continue to expand, and not just for consolidation." For example, more applications previously off limits to consolidation will be virtualized. Look for providers to offer support for more virtualization platforms and guest VMs, as well as for some applications or virtual applications to be ported to use and run on different service providers' VMs, he says.

Watch for continued interoperability and interchange of moving data, applications, and virtual machines among private, public, and hybrid or community cloud services. "This will also mean more and enhanced on-ramps or cloud access points of presences," he says. Schulz says servers will get faster and denser and include better intelligent power management (IPM) for smart management of resources. P

✔ Start Researching

Info-Tech Research Group lead research analyst John Sloan says most organizations won't look to adopt microserver architecture in the next year or so but more likely within the next three.

Companies with a strong Web 2.0 focus or those looking at such areas as big data that have an opportunity to buy infrastructure now might benefit from investigating microservers sooner rather than later, he says. "Often, a decision for IT managers is whether to go with a disruptive trend and realize the benefit and maybe buy stuff from a startup or vendor without a lot of enterprise credibility" or wait to see what big vendors will offer, he says.

✔ More Cores, More Power

Aberdeen Group senior research analyst Dick Csaplar says as servers continue to increase in power, "they pass certain tipping points where new application types or processes become deployable. Video analysis is a good example, as the power to open each video frame and analyze becomes possible with general-purpose servers."

This trend will continue and accelerate as the computers add more processing cores in the same chassis, he says. "New applications will continue to be deployed with previously unavailable compute usage. Also more of the computing power will go to assist the user, as opposed to just back-end processing," he says.

BONUS TIPS:

✔ Size To Fit

Greg Schulz, senior advisor at Server and StorageIO, says while many industry buzzwords, technologies, and products are targeted toward larger environments, some solutions are scaling down into small to midsized enterprises. "This means not just reducing the cost or taking out some functionality, it also means making them easier to find, acquire, deploy, and use on an ongoing basis," he says. There are many converged server platforms in the small to midsized enterprise space from traditional vendors and startups, for example.

✔ Gain Better Insight

Schulz says to pay attention to holistic DCIM solutions that expand beyond traditional facilities power, cooling, assessment, and management. Having insight on server, storage, networking, hardware, software, and services along with a facility's use and service levels enables making informed decisions on where to deploy SSD/flash, blade servers optimized for energy-efficient virtualization, and private clouds along with other popular buzzword themes, Schulz says.

HOW TO

Troubleshoot Drive Failures

The Tools, Procedures & Mindsets That Can Help Spot & Fix Drive-Related Troubles

If you were compiling a list of components within a data center that are considered vital to daily operations, storage would certainly make the cut. Because of how heavily enterprises rely on storage systems, it's imperative data center personnel be well-positioned to recognize and rectify drive-related issues (including full-blown failures) and have preventative measures in place. The following details some ins and outs concerning troubleshooting hard drive issues.

Start Here

One of the most valuable troubleshooting assets managers can have is a range of options, says Greg Schulz, senior advisor at Server and StorageIO. This means having a baseline of what's normal, so you can easily draw comparisons; good backup or standby copies; RAID for resiliency; and copies of encryption keys, security certificates, and the like. Often, for example, a Windows system might indicate a bad drive and support would suggest reinstalling the OS. "Knowing I have backups or copies gives me a chance to try a quick repair without a lengthy rebuild or restore," he says.

In facing full-blown drive failures, Schulz advises isolating or containing the fault to prevent a larger disaster from occurring. This requires up-front planning and configuring for failure- and fault-containment. For example, spend extra for quality drives rather than less expensive ones that lack the same resiliency. Additionally, invest in the configuration of drives, such as using RAID 6 vs. RAID 5 or RAID with rapid rebuild along with other enhanced RAID and erasure coding techniques. Also leverage replication to a second storage system for data that's time-sensitive.

Mike Karp, principal analyst at Ptak, Noel, and Associates, says periodic disk defragmentation is an easy way to prevent disk failures. Fragmented disks experience more read operations than those where the file data is stored contiguously, he says. The accumulated added stress from this, however small, contributes to disk failure.

"Defragmentation is easy, painless, and in almost every environment can be a touch-free automated process that's scheduled to run when disk usage is at its lowest," he says.

More difficult is rebuilding a RAID set. "In fact, it's during these rebuilds that a

Key Points

- It's important to be able to isolate or contain full-blown drive failures so they don't turn into major disasters.
- Have a baseline of drive performance in place from which managers can draw comparisons.
- Moving to newer drive technologies such as SSDs can prevent some drive-related issues from occurring.

significant portion of disk failures occur," Karp says, typically because of "some sort of operator error." He advises eliminating human interaction by seeking out RAID systems that provide automated rebuild procedures when possible. "The key rule here is that when a disk in a RAID set fails, it should be rebuilt immediately," he says.

Get Diagnostic

Most good storage systems or solutions today include diagnostic capabilities, Schulz says, including predictive detection capabilities. Tools such as SMART can interface with drives to detect and troubleshoot issues. Schulz says many drive issues that appear as problems "may in fact not be an actual bad drive, so some systems can take steps to try and get the drive back in use long enough to copy data off of it."

Schulz says to ensure that the diagnostics and predictive analysis solutions you invest in can determine if there are hard or soft repairable errors and start preventive repair. "Larger systems usually will have these tools; granted, some might be reserved for vendor maintenance personnel," he says.

Some downloadable tools can check drive health and status, run various tests, and query SMART data. "Granted, knowing what to do or not to do can be as important as knowing the tools exist," he says. "The last thing you want to do is cause a bigger problem in the course of fixing a small one."

Limit The Likelihood Of Problems

Karp says the idea of troubleshooting disks is actually a "bad approach to running a data center" for several reasons, including because it's "essentially a reactive concept." A better approach is creating an environment that limits the likelihood of problems occurring.

Troubleshooting disks, he says, is also an unlikely sustainable strategy because as disks get larger, they become increasingly prone to errors. As more of these disks enter the data center, the need for fixes will increase. "Few data centers have the time to invest in this sort of thing," he says. Worse, he says, "large disks take much more time to rebuild than do smaller disks. Much more time."

A more strategically viable approach is to look beyond classical RAID and consider newer technologies, he says, including data protection based on error correcting codes (ECCs) and object-based RAID ("objects rather than disks are raided").

"Remember that when a disk goes bad, the URE [unrecoverable read error] can only be fixed by rebuilding the entire disk. With larger disks, this rebuilding process can easily take more than a day," he says. "Rebuilding a small object rather than a large disk is a far more efficient approach to maintaining data integrity." Another alternative is moving to SSDs, which have no moving parts and eliminate the potential for mechanical-related failures. P

Top Tips

- ✔ Vendors should be able to remotely access and notify customers about potential problems before something goes wrong , says Greg Schulz, senior advisor at Server and StorageIO. Vendors should also have self-repair and self-healing capabilities with hot spares; automatic rebuilds or copies; and background integrity checks, cleans, and fixes.
- ✔ Schulz says to ensure that drives are encrypted so that if you need to replace one, important or sensitive data doesn't go missing.
- ✔ Mike Karp, principal analyst at Ptak, Noel, and Associates, says the "key issue here isn't to fix the devices but to make the data available to users. Thus, have a secondary system available and make sure that every backup you do is readable." Ensure backups are easily accessible so recoveries can be done quickly and cheaply as circumstances allow, he says.

Action Plan

- Use RAID, quality drives and configurations, and monitoring tools to pinpoint degrading performance, errors, and symptoms of failures.
- Ensure that a baseline denoting normal drive performance is available from which to draw comparisons.
- If encountering full-blown drive failures, isolate or contain the cause.
- Have good backups for storage systems and devices in place; if using snapshots, keep them elsewhere to avoid a single point of failure.
- Use RAID systems that can provide automated rebuild procedures.
- Follow vendors' recommended instructions for recovery, rebuilding, and other procedures.

Get Started

To ease troubleshooting tasks, Greg Schulz, senior advisor at Server and StorageIO, says data center personnel need to have a baseline to reference both normal performance and errors and other indicators to help verify a problem is actually occurring. You also need to have tools in place that can interrogate storage systems or devices to verify where the problem resides. "Most storage systems have these tools; however, for smaller or standalone systems there are also tools that can be used. Of course, having a good backup should go without saying," he says.

HOW TO

Keep Rising Data Center Temperatures In Check

Monitor Your Environment & Have An Emergency Plan In Place

Cooling efficiency is absolutely critical in data centers. If you can't maintain your equipment at the proper operating temperature, you're opening up the potential for performance issues or critical failures. Fortunately, cooling equipment will often shows signs of wear and tear shortly, if not long, before a full failure occurs.

For instance, Ken Monis, manager of product development at Data Aire (800/347-2473; www.dataaire.com), says that common signs of failure may include increase in mean temperature or humidity, which is more obvious, or you may hear unusual noises and vibrations that are most likely the start of a catastrophic failure, which could be difficult to detect. However, even if you hear these noises, it doesn't necessarily give you a good idea of when a failure may occur, so it's crucial to pay attention to equipment and regularly check it for potential issues.

You should also pay attention to facility-wide indicators, including temperature fluctuations and when the temperature in a building "barely meets a set point," says Gabriel Pizano, national sales and service manager at AmeriCool (800/680-0725; www.americoolinc.com).

If the overall temperature of your data center fluctuates wildly throughout the day, then it's a sign your air-conditioning unit may be in need of repair. Pizano also says that if you "set the temperature at 68 degrees, but the temperature is always at 70," then you are "undersized for the room." This means that you may require a higher-capacity cooling system that helps maintain the proper operating temperature for your equipment.

Monitor Temperature & Humidity

In order to spot temperature or humidity fluctuations in your data center, you need to monitor those metrics.

"The best means of ensuring that your data center is being properly cooled and humidified is to constantly monitor the critical entering and/or leaving conditions of the data center," Monis says. "Statistical analysis of these conditions would reveal the mean conditions of the data center as well as standard deviations from the mean conditions. Adding in time of day and time of year to the analysis

Key Points

- Monitor temperature and humidity to make sure you're maintaining the proper operating environment.
- Put an emergency plan in place to handle outages and failures. Keep your local air-conditioning expert on speed dial.
- Consider portable cooling units not only for emergency purposes, but as a lower-cost alternative to larger primary systems, depending on your capacity needs.

would strengthen the diagnostic ability of this data to account for any infiltration from outside the data center in lieu of a system failure."

Pizano agrees that monitoring is crucial and adds that you need to monitor temperatures in different places in the room, which will help you determine hot spots that may be correctable. Not only will you be able to focus more on these hot spots in the short term, but you'll also be able to take them into consideration when redesigning your layout or expanding your data center in the future.

Be Prepared In Case Of Emergency

Another key issue to consider when trying to keep temperatures down in your data center is to plan for emergency scenarios. You have to know what you'll do if your primary cooling system fails, whether that means having a full-scale backup solution in place or using spot coolers to help get you by in the meantime.

Pizano says that you also have to know whom to contact when there is an emergency and know which of your local portable air-conditioning distributors offer 24/7 support or delivery. He also adds that you should prioritize your data center equipment well beforehand to determine which pieces of equipment can be shut down to save resources and which mission-critical equipment requires round-the-clock cooling.

Utilize Portable Air-Conditioning Units

Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com), says that portable air conditioners are great for potential disaster or failure scenarios because they can be "ready to deliver emergency cooling in the event of a power outage or primary cooling system failure."

But Michel warns that spot cooler distributors are often overburdened in the summer, which means they might not have enough units to meet demand. That's why he suggests that data centers purchase a spot cooler or rent it for the summer to make sure they'll have a backup if supplemental cooling is needed to maintain temperature and humidity control.

In addition to emergency situations, portable air-conditioning units can "also provide a flexible and cost-effective alternative to precision cooling or split system cooling solutions," Michel says.

"Such permanently installed systems may often necessitate openings in the roof or outer wall as well as interior walls; use of cranes and other equipment to install rooftop systems; the use of external copper piping that requires sweating and brazing; charging units with refrigerant; and/or—with split systems—installing the condensing unit in a viable outdoor location," Michel says. "Portable coolers are much simpler to install and may cost only 20 to 30% as much as non-portable systems with similar capacity, while still performing the required function." P

Top Tips

- ✔ Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com), says that data centers need to "monitor the space to make sure data center temperature is maintained between 68 and 72 degrees" and that "relative humidity is between 40 and 55%."
- ✔ Ken Monis, manager of product development at Data Aire (800/347-2473; www.dataaire.com), recommends companies have "commonly replaced parts on hand to reduce the downtime either from a preventative repair or a system failure." This includes the "belts, evaporator fan motor, condenser fan motor, contractors, and fuses," he says.
- ✔ Gabriel Pizano, national sales and service manager at AmeriCool (800/680-0725; www.americoolinc.com), says that companies need to consider the data center's airflow. "All the cooling in the world will not help if there are airflow obstructions," he says.

Action Plan

- Monitor temperature, humidity, and any other metrics that relate to the overall cooling efficiency of your data center.
- Perform regular maintenance on your equipment to prevent minor issues from becoming major ones.
- Make sure your primary air-conditioning system has the right capacity for your data center and use portable units for hot spots, if necessary.
- If you can't meet cooling capacity, consider a layout change or equipment upgrade in the near future.
- Always be on the lookout for the newest, most efficient equipment. Newer servers can run at higher operating temperatures, which will require less cooling than older models.

Get Started

One of the best places to start when trying to efficiently cool your data center is to perform preventative maintenance. Ken Monis, manager of product development at Data Aire (800/347-2473; www.dataaire.com), says that all mechanical systems should be on a regular maintenance schedule. He also adds that having a qualified professional perform your scheduled maintenance will help prevent failures. "Their training and experience gives them the ability to recognize an issue long before it becomes a critical failure."

SIX QUICK TIPS

Improve The Availability Of Your Network

Steps To Enhance & Ensure Performance, Uptime

PROVIDING DEPENDABLE, STEADY network availability to employees and customers has long been an important factor for successful enterprises. Another increasingly vital factor for leading companies has been providing consistently reliable network availability to their mobile workforces seeking to tap in to the company network from all corners of the globe. The following details steps that enterprises should be taking to enhance network availability for mobile workers and the processes, programs, and tools that can help.

✔ Improve Monitoring & Management

It may sound simple, but to start improving network availability, you need to have the capabilities to understand what kinds of problems the company is experiencing. This requires having visibility into the network.

Mark Tauschek, an analyst at Info-Tech Research Group, says poor network management system skills cause many organizations to fall behind in terms of network visibility. "The first step in terms of having visibility into your network, the performance of your network, the availability of your network, is to be constantly monitoring it," he says. "A lot of folks either don't have a network management system or don't use it or don't use it properly."

Larry Hettick, contributing analyst at Current Analysis, echoes this sentiment. Sometimes, he says, networks provide some indication of pending issues, such as increased packet loss, congestion, or other areas. Other times, an outage is a complete surprise, he says. In either case, though, "a proper monitoring and management system is essential for both carrier services and in-private networks," he says. "Planning for an outage and the business response can help bring networks back up more quickly. Service providers plan and practice for recovery, and enterprises should do the same."

✔ Use What You Already Have

Exactly why enterprises don't better monitor their networks is a question Tauschek says he regularly asks clients. When asking if companies can report their current traffic flows; what data they're extracting; and what alerts, alarms, and thresholds they have configured, he says, "usually the answer is no." Generally, he says, this is due to the company's lack of resources.

To change the situation, Tauschek advises using features and functionality that are already available, which can mean "free, open-source, and relatively low-cost solutions" vs. spending significant sums for "full-blown functionality." Often, he says, just using tools that are already on hand or can be easily acquired is "like putting glasses on if you're near-sighted."

Using a network management system or flow analyzer built into it, Tauschek says, can enable IT to detect, say, an employee firing up multiple YouTube sessions or downloading scads of torrents or possibly a particular application that's misbehaving and soaking up bandwidth. "There are almost endless

scenarios of the kind of visibility you can get that can solve problems almost immediately" that don't require huge investments, he says. "All you really have to invest is maybe some research and a little bit of training and use the tools that you probably already have."

✔ Be Redundant

Where network availability is concerned, Hettick says, IT managers need to provide as much redundancy as they can afford, whether for public services, private networks, or a hybrid. Here, he says, IT should consider redundant access technologies, including a backup option for mission-critical network equipment (such as routers), as well as a way to create immediate access to content and apps. "A hybrid private and public cloud may be the most cost-effective strategy that allows for remote access to a hosted app/content network," he says. "Nearly all carriers will also offer this solution as a managed service."

To cost-effectively add capacity, Tauschek says, use a multiple-link router to balance inexpensive broadband connections. "There are all kinds of things you can do to improve availability inside the network, from the network out to other networks, and from other networks into the network," he says. "Having redundancy is an obvious answer."

In terms of mobile or remote workers seeking to tap in to the network for application access, he says, a company would want to have redundancy built in for the servers that applications run on. If a server goes down or there is too much traffic, an application delivery controller could load balance or failover to what's available, he says.

✔ Know The Trends

One of the more positive WLAN-related trends currently occurring, Hettick says, is a proliferation of free Wi-Fi hot spots available from carriers and other enterprises. This "can help with mobile access as an alternative as needed for road warriors and even as a backup plan for localized outages," he says.

Another positive trend is the ability to easily "roam" between Wi-Fi access points, as well as "the choice to roam between Wi-Fi and mobile (cellular) networks." Additionally, he says, WLAN is getting faster every year—a trend that will continue, although "the WAN access speed will still likely be the choke point." Hettick notes that QoS "is possible on public and private WLANs, so applications can be prioritized to better manage traffic."

Tauschek says vendors are now actively and aggressively working on solutions to work toward 100% availability. "The next kind of evolution really in networking and network management is software-defined networking," he says. "That's something that vendors are very aggressively pursuing right now. It's in the very early stages, it's not widely deployed, but in the next year to 18 months, it's going to start to hit critical mass and probably cross the chasm." When SDN gets to that point, he says, "then you have a management layer and a visibility layer built in to your network infrastructure that just allows you so much more flexibility." P

✔ Check Availability Of Cloud Computing Services

Current Analysis contributing analyst Larry Hettick says that, compared to premises-based alternatives, cloud computing services can cost-effectively improve network availability, "so long as the provider has sufficient redundancy and geographic diversity to overcome outages." Hettick adds, however, that the ability to securely access the cloud service via wired, wireless, and remote access alternative paths is paramount.

✔ Watch For Ways To Cut Costs

In terms of applying cost-effective measures to improve network availability, every case is different, says Larry Hettick, contributing analyst at Current Analysis. He advises small to midsized enterprises to ask their equipment provider, VAR, and service provider to "provide alternatives, along with the cost and associated business case for each alternative. These suppliers have ready-made tools and experience that the enterprise should leverage to help make business-case decisions."

BONUS TIPS:

✔ Get Trained

One reason many small to midsized enterprises don't have better network visibility is that they lack general knowledge of networking and possess "a little fear, as well," says Info-Tech Research Group analyst Mark Tauschek. In many small to midsized enterprises, IT personnel are "jacks-of-all-trades" not "comfortable with the intricacies of an enterprise network and the implications," he says.

An easy-to-implement and relatively inexpensive solution is providing basic training to preferably two IT members, something that may involve a few days or week but that can go a long way toward "gaining understanding and taking action to improve the performance and availability of your network quickly," he says.

✔ Welcome The Pain

Tauschek says that, unfortunately, some small to midsized enterprises have to be experiencing a sufficient amount of pain associated with the network before actually moving to improve their network availability. This, he says, is "what's going to drive the CIO or infrastructure manager or director to actually take some action." Typically, he says, the "pain" will manifest itself in the form of employees lodging such complaints as "Look, this network is terrible. What are you going to do to fix it?"

SIX QUICK TIPS

Boost Enterprise Backups

Techniques, Policies & Approaches To Simplify The Process

If there is a necessary evil that exists within enterprise data centers, it's the data backup process. IT and data center managers may not enthusiastically embrace having to perpetually deal with the ins and outs of backing up the company's data, but failing to do so can ultimately prove to be a far greater pain in their necks. The good news is that there are numerous steps that managers can implement to make backup duties less painful. These include relatively quick and simple approaches that can prove extremely effective.

✔ Develop A Backup Plan

Making the backup process as efficient as possible can go a long way toward easing managers' burdens. Having a plan that's executed and tested is key, says Greg Schulz, senior advisor at Server and Storage IO. The process entails checking that backups, copies, or replications are working by performing random audits and reviews.

✔ Rethink Your Approach

To know where you're headed, you sometimes must revisit where you've been. To that end, Schulz advises revisiting why you're protecting data and applications against various threat risks and assess if you're treating all data equally or aligning resources (people, hardware, software, time, and budgets) to different threat scenarios. Be sure to revisit how often you're protecting or backing up data, if you're doing full or incremental backups, and how long you're retaining data.

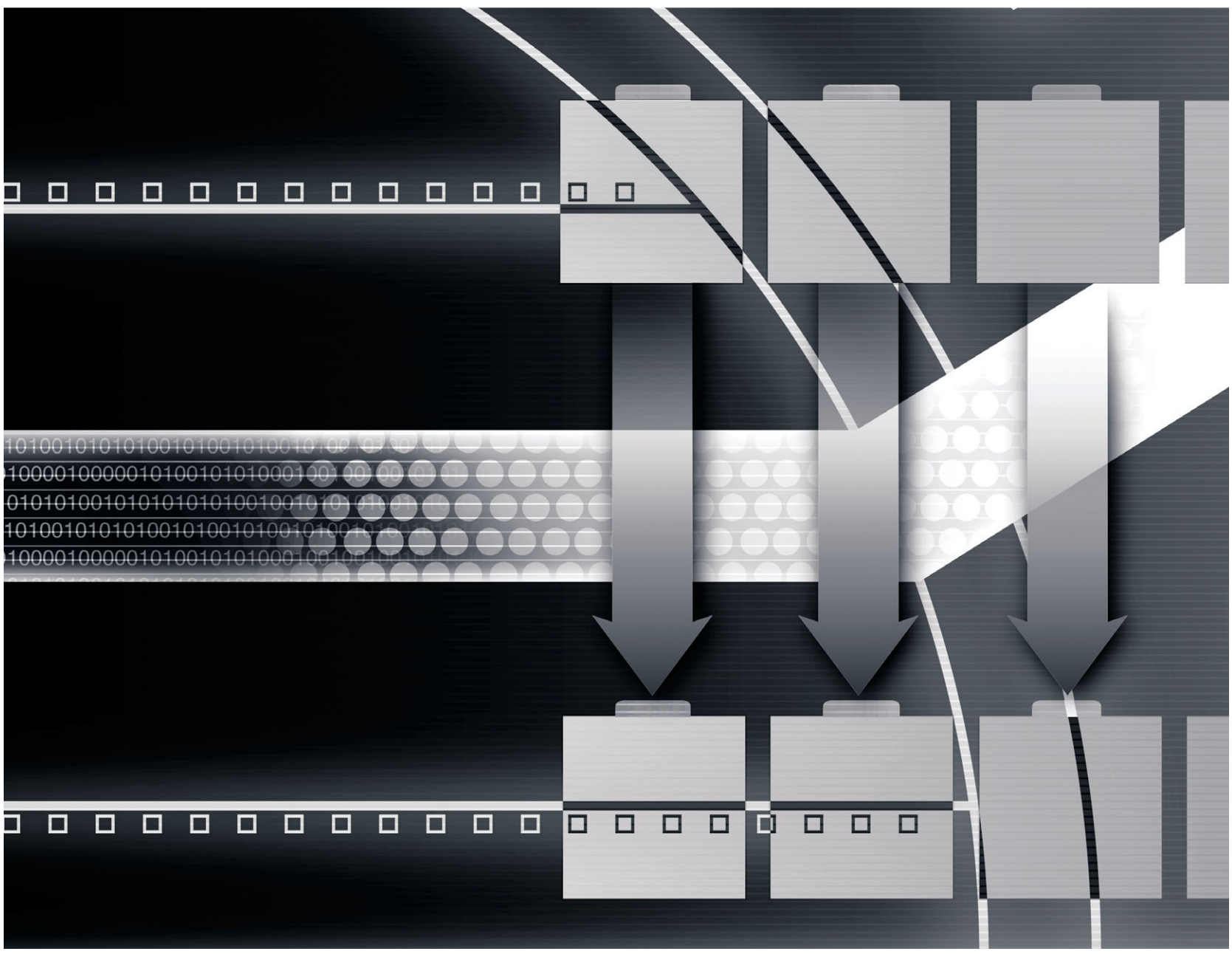
Schulz advises rethinking how your company is doing data protection and to "look beyond the media or medium. Look at how the tools are used or can be used in new and innovative ways."

Schulz says it's also important to check if you're expiring or setting retention on media to keep costs down and reducing the data-footprint impact at the source by archiving email, databases, file systems, and home directories. "You might be surprised how simply using what you already have in new ways can stretch things to go further and buy some time while getting ready to take the next, more strategic steps," he says. "Don't forget about removing complexity; whenever you take out complexity, you can take out cost. Rethink how you're protecting data, which means more than just swapping out tape for disk for cloud or deduping."

✔ Uncomplicate The Process

Andy Jensen, product manager at Barracuda Networks (888/268-4772; www.barracudanetworks.com), says that, historically, backup has been an overcomplicated process, often involving a non-intuitive interface complicated by years of bolt-on features and a requirement to use multiple vendors to solve backup needs.

"In the simplest models, you would get backup software from one place, storage



from another, and offsite disaster recovery protection from yet another," he says.

With many backup solutions, it was difficult to verify whether you would actually be able to restore the data you had protected, he says. "Five years ago, the vast majority of backups were put on removable media and stored on a shelf or in a closet, and when an admin needed to restore data, they'd pull it off the shelf and cross their fingers." Because the only other option was to not have a backup at all, Jensen says, storage administrators knew it was often better to go through the pain and have a shot at recovering your data than to have no shot at all.

"Businesses don't survive without that data." That's why he recommends companies invest in solutions that reduce the complexity of the process. "Very frequently, backup is a secondary concern of the admin team. It is not a full-time job; it is one of many tasks they perform."

✔ Pick The Best Product

Determining the best backup solution for the enterprise and implementing it requires IT to address numerous issues, including knowing how the solution will hold up in the future. Essentially, says Jason Buffington, Enterprise Strategy Group analyst, the future consists of "this year and next year and likely the one after that." During that time, however, it's possible the enterprise could outgrow the backup solution if business prospers and must evolve to meet growing needs, Buffington says.

So, how do you best plan for future backup needs? One way, Buffington says, is asking vendors how they'd change their products and solutions now to meet two times, five times, and 10 times more data, "which arguably are only one, two, and potentially three years away, respectively."

Jensen says a good backup solution should minimize the time and effort necessary to perform backups and ensure data is protected offsite. "An end-to-end solution can really help get you there," he says.

Be prepared to spend what's needed, Buffington says. "While everyone wants to spend pennies to save dollars, real data protection may cost dimes, not pennies—but you'll still be saving dollars," he says. Often, management may underestimate the financial impact downtime or lost data has until it's too late, he says. "In today's market, that may mean losing a key client or potentially being unable keep the doors open just because you can't get your data back," Buffington says.

But don't fall under the assumption that you need to match the protection levels of large enterprises. "Don't overestimate what you need, or sticker-shock will kill you," he says. "Don't underestimate, or you won't be able to recover. Understand what you need and it will 'fit' financially. Just be sure that you have the right tailor so the 'fit' is correct." P

✔ Preparation Is Key To Restores

Backup is important for storing data in case of disaster, but it's possible to get caught up in the backup portion and overlook the importance of recovery. Enterprises back up data in order to have a restore point for the company's system; this aspect of the backup solution should be equally researched.

To that end, preparation is really key when performing a restore, says Andy Jensen, product manager at Barracuda Networks (888/268-4772; www.barracudanetworks.com).

"The administrator is going to have a much easier, more sane experience if they have done some testing and been through the process before they are in some kind of emergency situation," he says. As a general guideline, Jensen says Barracuda has found that customers are most successful when they are testing their restore process a few times a year. "It will really help minimize downtime."

✔ Look To Virtualization & The Cloud

Andy Jensen, product manager at Barracuda Networks (888/268-4772; www.barracudanetworks.com), says the virtualization and cloud spaces have some of the most exciting developments going on right now. "Both technologies offer unique recovery options that increase the availability of customer data and reduce downtime for an organization," he says.

Greg Schulz, senior advisor at Server and Storage IO, agrees, adding, "Virtualization and cloud are important tools to help with enabling a resilient, flexible, and scalable data infrastructure; however, clouds and virtualization also need to be protected."

BONUS TIPS:

✔ Simplify Where Possible

For many small to midsized enterprises, adopting a backup philosophy that stresses simplicity makes the most sense. Simplicity can include enlisting such approaches as using cloud-based backup and recovery services to offload tasks IT has traditionally done. Simplicity can also involve using products that automate processes where possible but enable IT to still control the automation policies.

✔ Check Bandwidth Before Committing To The Cloud

Bandwidth is something all companies should consider before committing to cloud backup. For example, says Enterprise Strategy Group analyst Jason Buffington, "if your WAN connection was already relatively busy, adding backup as a service will break it. You're going to start pushing a whole lot more data across your wire than you used to." Some cloud providers, he says, provide options tied to telcos so it's all part of one bill.

SIX QUICK TIPS

Protect & Manage Unstructured Data

Develop Strategies & Policies, Then Back Them Up With Technology

Most IT administrators have a solid grasp on structured data, which comes from databases, applications, and other primary information sources. But unstructured data can be an entirely new challenge. Rather than relatively easy-to-manage data points and sources, unstructured data sources consist of emails, information stored on private hard drives, and other such items.

You might be surprised to know how much unstructured data you have. Alan Dayley, research director at Gartner, says unstructured data makes up "as much as 80% of an organization's data now, with database and application data only being 20%." And these numbers are expected to rise as "the growth rate of unstructured data is in the 40 to 60% range, whereas structured data is probably closer to the 20% range," Dayley says.

Because the amount of structured data is growing at a fast pace, IT teams are looking for ways to better manage and protect those information sources. There are ways to tackle the issue, some of which involve technology solutions, and others that require strategy and policy adjustments.

✔ Standard Search Engines Won't Cut It

George Goodall, senior consulting analyst at Info-Tech Research Group, says that some people think they can "slap a search engine" on their infrastructure and essentially use a standard, popular search engine. The problem with this approach is that public search engines are great for finding more general information due to the "very good linking structure on the Web" and the way that search engines essentially rank links based on authority. However, Goodall says that after you find something on the Web, it can be difficult to find that exact same link a few days later.

This doesn't work inside a business because you aren't searching for general topics, but rather for specific sales presentations and other documents. Plus, an intranet search engine wouldn't necessarily be able to spot all types of unstructured data unless it were custom tailored to do so.

"When we look on the intranet side of things, we have very specific user demands, a much smaller collection to search against, and we don't have the linking structure," Goodall says. "Only when we've identified and profiled our information sources as well as identified the information needs of our users can we tune our search engines so that they work."

✔ Use Data Analysis Tools

Dayley recommends that companies dealing with unstructured data issues consider implementing data analysis tools that give you a better idea of what data you have and where it is. He says that these tools "give you a really good visualization of your unstructured data" and they "query all different types of data," whether it be email, file shares, or other sources "and give you good reports around all of

the metadata." It goes beyond letting you know who created the file and when by also giving you information such as when it was last touched and what other applications it is tied to, Dayley says.

Data analysis tools also make it easier for IT administrators to present possible strategies to business owners. For example, using data analysis, you can spot duplicate or redundant data, Dayley says. Then, he says, you can dig deeper and identify data that perhaps hasn't been touched for years or belongs to owners that aren't even with the company anymore. Data analysis tools not only help you understand your data better but also let you cut down on the amount of unnecessary unstructured data simply taking up space.

✔ Create A Backup Policy

Unstructured data can cause backup and recovery issues for organizations that don't prepare ahead of time. When deciding what types of unstructured data to back up, Goodall says to profile information sources in terms of risk or value. "We can look at certain information sources and say these things are records, which we need to retain for compliance purposes because they're related to HR, financials, or environmental compliance."

Prioritizing data will also help determine where those unstructured data backups should go. "For a lot of organizations, if it's a record, then you probably want to maintain it on a fairly robust piece of infrastructure," he says.

✔ Properly Secure The Data

Unstructured data is not only difficult to locate and manage, but it also can create some security challenges. For instance, users can store information on their laptops or in personal email folders, which are difficult to view from an IT administrator perspective.

When it comes to personal email folders, Dayley says that companies can actually "turn off the ability for users to create PSTs, so they're not able to put them on their laptop or shared drive." As an extra layer of security, he says, companies can lock down applications, so users "can't actually move data out" or you could use virtual desktops to store data locally and provide "agnostic access through any device, laptop, or mobile."

Security policies also need to be tailored to unstructured data, especially in situations where file sharing services are used.

Goodall says that employees will sometimes ask why they can't use file sharing sites and while "it might make sense for a certain project, IT is completely out of the governance loop." Because the IT team has no management over the service itself, "there is no control around recovery and very poor auditability in cases of litigation." In other words, he says, if your employees want to use file sharing, you may need to develop your own internal system to prevent them from taking advantage of public alternatives. P

✔ No All-In-One Fix Exists

There isn't an all-in-one system that will help overcome unstructured data issues. "Some people think they need this big tree-oriented classification scheme like the Dewey Decimal System for their enterprise documents, but that's an incredibly difficult process," says George Goodall, senior consulting analyst at Info-Tech Research.

Instead, Goodall recommends that companies simplify the process. "It's easier to say, 'let's drill this down to who are our key users and what are our key needs and start from there,'" he says. "The reality of these things is that it's very organic, and by the time you bring in this all-encompassing system, your users, business, and information will have changed."

✔ Use Technology To Back Up Policy

"It's always better to create policies upfront on how you're going to manage [unstructured data] and how you classify information, even before you create it," says Alan Dayley, research director at Gartner. For example, a government agency that contacted Dayley requested advice on how to implement a new infrastructure system that would generate 10 times the amount of data as the old one. Dayley simply helped the agency develop policies from the beginning that would allow them to save space but still get the same performance.

"They wanted to know how to set up the best policies ahead of time so they could categorize information and delete it as they went along to minimize the problem," Dayley says. "The key to this whole thing is upfront policy management with buy-in across the whole organization and executive sponsorship. That's what the most successful organizations are doing."

BONUS TIPS:

✔ Don't Spend The Pain Away

George Goodall, senior consulting analyst at Info-Tech Research Group, stresses that "you can't CAPEX your way out of this [unstructured data] problem." It's much more important to focus on strategies, policies, and procedures and to "profile your information sources" to determine their "risk or potential value to the organization." You may discover that you already have the means to organize and protect your data after you find a way to better visualize it.

✔ Remove Repetitious Data

Redundant data is another issue that many companies face when it comes to an overabundance of unstructured data. Goodall says that this type of data can cause situations where "people are using the wrong version of a document, using data documents, or simply making errors." This is a great use case for data analysis tools because you can locate repetitious data, determine its value, and then delete it if necessary.

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Affordable, Advanced Environmental Monitoring

The AVTECH Room Alert 3E Is Flexible & Feature-Rich In A Small Footprint & Costs Just $145

ENVIRONMENTAL MONITORING isn't new to IT and data center managers. In fact, most companies have purchased at least one, if not multiple solutions designed to warn you if the temperature or other conditions inside a rack are nearing a specified threshold. But these solutions vary wildly in terms of price, size, and feature-set, which can make it difficult to make changes to your overall system or cause you to lose focus on environmental monitoring altogether.

But it's more important than ever to extend the life of equipment, ensure efficiency, and prevent unnecessary damage to servers and other equipment through the use of environmental monitoring devices.

AVTECH has been working diligently over the past 25 years to not only make improvements to its own products but help move the entire industry forward and set new standards. With the Room Alert 3E, AVTECH has packed its years of experience and technological know-how into a smaller and more affordable solution that's full of new features designed to minimize downtime and give you a heads up before a small issue becomes a potentially larger problem.

Small Footprint & Price

With a footprint of about six square inches and a weight of two ounces, the AVTECH Room Alert 3E takes up much less physical space than most other environmental monitoring solutions. And it does so without skimping on crucial features. With such a small footprint, you can focus on where environmental monitoring is needed the most and quickly and easily implement a Room Alert 3E.

AVTECH says the 3E's $145 price tag will quickly pay for itself in downtime prevention. "When considering the total cost of IT equipment at an organization, the labor expense to replace equipment when it gets damaged, and the cost per minute of downtime for an organization, Room Alert 3E will be as valuable to an IT manager as an extra 15 minutes of oxygen is to a scuba diver," says Michael Sigourney, senior product specialist at AVTECH. "When things go bad, it's a life-saver."

Benefits From Experience

The Room Alert 3E is the 14th new model released since 1998. AVTECH was able to take everything from previous models, hone in on the most important features, and put them in a tighter package with a few extras.

The device has a built-in temperature sensor and a digital port for connecting an additional digital sensor for other environmental factors or a light tower and relay adapter, which can be shared by all Room Alert monitors across a network, Sigourney says. For power, you can take advantage of the built-in PoE capabilities or add an optional AVTECH 5v 1A power adapter for $15.

As with most other AVTECH environmental monitoring devices, the Room Alert 3E comes with AVTECH's powerful Device Manager software. The software is used as an alternative to the built-in Web browser interface or a generic SNMP monitoring application, providing advanced discovery, management, alerting, logging, graphing, a dashboard interface, and more, Sigourney says.

> "AVTECH's Maintenance, Support & Update Service (MSUS) program provides our customers with unlimited technical support; download access for firmware-software-MIBs, which typically includes two to four updates a year; and provides our 100% replacement guarantee for the Room Alert monitor."
> - AVTECH's Michael Sigourney

With the Room Alert 3E, you can receive alerts via email, email-to-SMS, SNMP, Web page update, and more. Plus, Device Manager takes advantage of AVTECH's new PUSH technology, which lets you configure Room Alert monitors to send event data outbound from within a secured network to Device Manager on a different network for alerting and auto-response. This allows organizations to monitor across multiple networks securely, without inbound network access. Device Manager also lets you combine network cameras with Room Alert devices and see unlimited camera views in a single screen, snapshots and video links in alerts, says Sigourney.

Flexibility & Support

The Room Alert 3E is flexible both in terms of size and feature-set. You can choose to purchase one device for a single use, implement one or more devices into an existing system, or build an entirely new environmental monitoring infrastructure complete with in-depth management software. AVTECH backs up its products with world-class customer support, which is free of charge for the first year and can be renewed on annual basis for a small fee.

"AVTECH's Maintenance, Support & Update Service (MSUS) program provides our customers with unlimited technical support; download access for firmware-software-MIBs, which typically includes two to four updates a year; and provides our 100% replacement guarantee for the Room Alert monitor," Sigourney says.

In many cases, Sigourney says, the cost of an MSUS plan comes down to pennies a day and even less per unit if they purchase multiple Room Alert 3E devices. It's just another sign of AVTECH's commitment to its customers, which now number more than 110,000 in 106 countries. "We're proud of our MSUS program and appreciate every single customer we've had the privilege to earn."

Contact:
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For more information, call (800) 334-7458 or go to www.processor.com.

Buying Tips:

Data Center Furniture

Furniture is the real backbone of your data center. That's why purchasing furniture that matches your needs is essential. Here's what to keep in mind.

✔ Know Your Company

The furniture you choose depends on the services your company provides. "Some companies need conference room furniture for secure and private consultations, and others, such as network centers, might utilize server cabinets or colocation cabinets and racks," says Susan Wynne, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net)

✔ Research Available Vendors

A solid data center furniture vendor will have a long track record of providing high-quality products and services. That ensures you can view it as a partner and work with the company for years to come. "You want a vendor that you can invest in for the future," says Eli Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com). "You don't want to deal with a company that will only be around for a one-time purchase."

Also, be sure to research all of your available options. "Look for a reputable company with knowledgeable sales staff and one with short lead times," Wynne says. She also recommends spending more money upfront on quality products from a long-standing vendor. "The initial investment may be more than you wanted to spend, [but] the furniture will stand the test of time."

✔ Check For Quality

Once your budget is established, you can get the best value for the dollars you spend by looking for the best materials for your price range. For example, the frame makes a big difference in a piece of furniture's durability. Especially for desks, a steel frame with cross supports is going to be the most durable model. As for surfaces, high-density laminate and high-density pressboard are good choices.

✔ Make Sure It Fits The Space

Before buying furniture, first do some planning, Wynne says. "Know the function of the room. Have in mind a design or layout of the space you're wanting to create. A sketch or draft of the room with the various components in place is helpful," she says.

Know the dimensions of the space and furniture to ensure you meet requirements. Also helpful is knowing how a workstation will be used and by how many people to ensure overall comfort. Be sure to note whether the surface of the furniture has a lip of some kind that makes it wider at the top than at the bottom, and don't forget to leave space for drawers to pull out in cabinets or for people to work in front of the furniture.

Marking the space with tape can show you how much space the furniture takes up as well as what kind of walking space will be left over once it's there. If you prefer not to do it yourself, many furniture vendors offer design templates or free space planning.

✔ Use Your Space Efficiently

You can save money without sacrificing quality by making sure you are using space efficiently. One way to do this is to go vertical rather than horizontal, possibly by investing in pieces of furniture that are wall-mountable. "Office and lab space is at a premium," says Kristen Speranza-Diamond, vice president at Hergo. "It's beneficial to go vertical and make the best use of square footage."

Speranza-Diamond says that most necessary pieces of furniture and equipment for data centers are becoming less expensive, "so everyone is upgrading and making the transition to go compact." Manufacturers are putting more advanced technology into smaller packages, which will help you put more equipment into each piece of furniture.

✔ Focus On The Future

Be sure to look for key features, such as height adjustment for chairs or cable management systems for racks. If you invest in modular furniture with swappable pieces, you'll have room for future growth, Wynne says.

Choose furniture that will have a long life span. "You have to know that your current furniture will still be available in six or 12 months should you wish to duplicate or expand," Wynne says. P

Key Terms

adjustable height
Refers to components users can raise or lower for a better individual fit. Some higher-end furniture can be adjusted electronically.

cable management
Built-in grommets, channels, or other features to manage cables and wiring.

modular
Furniture components that are interchangeable or can be easily modified.

Buyers' Checklist

- ✔ **Seek out quality.** Although looking for deals can help companies on a tight budget, sacrificing quality as a result can end up costing companies more in the long term, especially if buying from vendors that don't offer lifetime warranties on furniture.
- ✔ **Know the delivery terms.** Determine if the delivery includes bringing it inside the facility, requires a lift gate or loading dock, and includes assembly or puts the responsibility on you or a third-party installer.
- ✔ **Go modular when possible.** Buying components that are interchangeable lets you modify the setup to meet changing needs, including downsizing or expanding space. Increasingly, individual furniture units can be mixed and matched and layout configurations easily altered.
- ✔ **Build vertically.** Purchase components that support building vertically for better space efficiency.

Buying Tips:

Colocation Providers

When selecting a colocation provider, it's crucial to get it right the first time, says Darin Stahl, Info-Tech Research Group lead analyst. "When you get into a colocation, switching costs are enormous," he says. "This isn't like buying a bunch of photocopiers, being unhappy with them, and putting them to the curb and getting new [copiers] in. It's a big deal to go through switching." To find a good fit with a colocation provider, consider the following.

✔ Understand The Options

Stahl says the colocation/managed service providers market can be categorized into three tiers. Tier one vendors typically have significant market influence and enormous geographic scale, he says. Tier two vendors generally have the same qualifications but less market influence and possibly less geographic scale. Tier three vendors are basically everyone else, he says.

Although price is a factor when comparing providers, it shouldn't be the driving factor. Smaller colocation providers that compete on price and don't own their facility typically can't offer an iron-clad SLA around the actual facility, Stahl says.

Lynda Stadtmueller, program director for cloud computing services at Frost & Sullivan's Stratecast division, agrees, adding, "There's too much at stake . . . to go low bid." Colocation, she says, "is not a commodity; every provider has different configurations, capacity, processes, and systems that can seriously impact your applications."

✔ Consider Usage & Location

Be sure to consider how you want to use the facility and for what purpose. Some companies invest in colocation so they can cut down on internal data center and infrastructure costs while others hope to set up a safe solution for disaster recovery. Once you know how you intend to use equipment in your colocation environment, you can then find the best location.

✔ Make Sure There Is Room For Growth & Expansion

Although it's important to put a heavy focus on what your company needs now in terms of equipment and performance, it's also crucial to look to your company's potential future needs and ensure there is enough room for expansion years down the road. Instead of backing yourself into a corner, make sure your colocation provider's facility is flexible enough to support more or less equipment depending on whether you wish to expand or consolidate at a later date.

✔ Know The Reputation Of Your Provider & Its Facility

Checking a colocation provider's past history is as important as making sure it's in a safe location, if not more so. Request customer referrals whenever possible and gather as much information as you can about the provider before you make your decision.

✔ Check The SLA

"Be sure to compare the SLA to the services you are planning to use," advises Brett Femrite, sales manager at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Some SLAs have varying levels of coverage based on the services that you choose. Be sure to note whether there is a redundant service offering that you must opt in to use in order to be fully covered by the SLA. Examples include A/B power or redundant network connections."

Stahl says to push for the contract to include an annual services review and ability to right-size or contract services so you don't pay for, say, server space you don't need. Some of the best vendors do this upfront, he says, while others will with a push and some not at all. Conduct a quarterly operations-style meeting with the vendor to discuss what you did in the space during that time, what worked and didn't, and what you have planned. Ask the vendor to do likewise, which may result in learning the vendor's scheduled outages. P

Buyers' Checklist

- ✔ Who owns the colocation facility?
- ✔ What are your short- and long-term plans for the facility?
- ✔ What options are in place for potential company growth and expansion?
- ✔ How much power and space do you need?
- ✔ Does the facility offer 24/7/365 customer service?

Key Terms

cabinets, cages, and suites
Terms used to describe how much space a company needs for its colocation resources. Cabinets are for companies that only need a small amount of space; suites, vaults, or rooms are required for larger-scale colocation needs.

geographic risk mitigation
The practice of selecting a colocation provider and facility based on the location of its data center. For instance, choosing a data center located in a region with a calmer climate vs. one located in a region that's prone to hurricanes, earthquakes, or other natural disasters.

Buying Tips:

DCIM Solutions

Data center managers are eyeing DCIM (data center infrastructure management) solutions for the numerous benefits they can offer by providing a holistic view of data center and facilities infrastructures. Here are some of the key elements to consider when purchasing a solution.

✔ Know What DCIM Can Do

DCIM solutions enable IT to view real-time power and temperature usage data on a granular level and provide monitoring, management, automation, optimization, and capacity and budget planning capabilities, all of which lead to the streamlining of operations and improving energy consumption and overall efficiency. Along with that real-time, holistic view into power, cooling, and other IT and physical assets, you'll get documentation, control, visibility, and metrics tools all in one solution.

DCIM solutions can replace spreadsheets, paper records, CAD drawings, and similar tools traditionally used to track assets. You'll gain real-time, in-depth views into physical and IT assets because, with DCIM, you'll have a firm understanding of where your infrastructure assets exist and where spare capacity exists.

Other benefits include quick completion of company-required changes; the ability to receive complete capacity data for power, rack units, cooling, chassis, and network capacity consolidated into one system; less downtime; and precise views of capacity, trend, and environmental data for everyone to access.

✔ Find The Right Product To Meet Your Needs

When comparing DCIM solutions, be sure to consider what your greatest need is and your ability to fully use the platform's tools. For example, determine whether you have the resources in place to address issues the DCIM solution uncovers and change the facility or operating procedures to enable improvements.

The maturing of the DCIM market means there are products suitable for even small enterprises. When evaluating vendors, look for ones that have forged strong links with the leading enterprise IT management vendors. In some cases, your existing power vendors may offer solutions. This would be a good starting point as you already trust them as vendors.

Greg Schulz, senior advisor at Server and StorageIO, says to pay attention to holistic DCIM solutions that expand beyond traditional facilities power, cooling, assessment, and management. Having insight on server, storage, networking, hardware, software, and services along with a facility's use and service levels enables making informed decisions on where to deploy SSD/flash, blade servers optimized for energy-efficient virtualization, and private clouds along with other popular buzzword themes, Schulz says.

Don't forget that, with whatever DCIM application you choose, you need to have the infrastructure support to run and maintain the application, says Alex North, director of business development at BayTech (800/523-2702; www.baytech.net).

✔ Seek An Easy Migration

Rather than re-creating the wheel, seek out a DCIM solution that supports easily migrating existing data to the new system, says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). For example, if you're maintaining multiple spreadsheets, CAD drawings, and other diagrams, he says, "migrating that information into the DCIM solution easily will be a lifesaver."

The solution should allow data center managers to start small and work up to added levels of sophistication in phases, he says. "Flexibility can breed complexity, and while a full-featured DCIM solution can seem complicated, getting started doesn't have to be." A modular solution that enables initially buying what's needed and layering in additional features gradually is a nice benefit. P

Buyers' Checklist

✔ **Plan for the future.** A DCIM solution should support capacity and optimization planning, offering tools that help "determine future requirements for power, cooling, floor space, rack space, and contingency planning," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

✔ **Know what you're up against.** Possible obstacles to acquiring a DCIM solution can include the company's finance department vetoing the purchase; departments having different solutions in mind, leading to paralysis; vendors not providing a solution priced for the small to midsized enterprise; lack of manpower needed to learn, implement, and oversee the solution; and poor or slow solution support. Before investing in DCIM, know how you'll handle these obstacles.

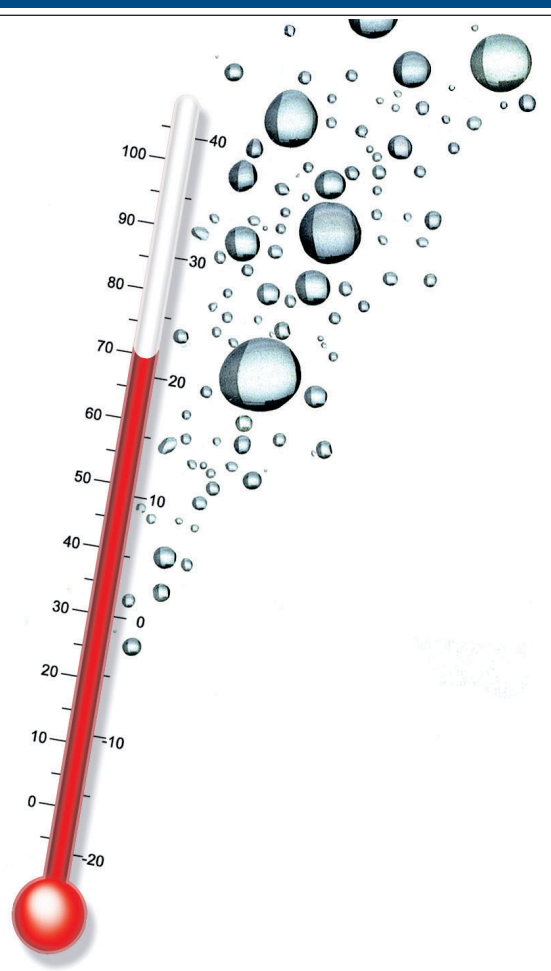
Key Terms

Corporate Average Data center Efficiency (CADE) and Power to Performance Effectiveness (PPE)
Two rating systems, created by McKinsey and Gartner, that go beyond power usage effectiveness (PUE) and account for IT energy efficiency. Both systems are designed to help IT managers address low server utilization, which is the biggest source of waste in data centers today.

point solutions
Many DCIM vendors offer only one or two DCIM components, or points, rather than an entire suite of DCIM tools.

Buying Tips:

Environmental Monitoring Equipment



Environmental monitoring offerings are not things an enterprise invests in on a whim. Every organization has unique infrastructure limitations, climate issues, and monitoring needs, so there's no one-size-fits-all solution. Here's what to look for.

✔ Define Your Needs & Threats

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says you need to know what types of threats might occur. "The most common environmental risk is excessive heat within the cabinets, so you'll definitely want to make sure you are monitoring temperature," she says. Other potential environmental dangers include power surges/loss of power, humidity, smoke, airflow, and room/cabinet entry.

"Know thy facility," says Michael Sigourney, senior product specialist at AVTECH (888/220-6700; www.avtech.com). "The first thing an IT or facilities manager needs to consider and create is an understanding of the basic layout and elements, both structure and equipment, within their facility. Knowing where threats are likely to occur or have occurred in the past is key to planning success."

Water and leak detection can be easy to neglect. Chris Pullen, president of RLE Technologies (800/518-1519; www.rletech.com), says that, while power failure is the No. 1 cause of downtime, water is the second and can often be the overall cause of a power failure. He says you need to install leak detection throughout your facility. "Don't forget to look above the ceiling. What's on the floors above your data center? Look outside the box."

✔ Understand The Options

With so many choices, it's tough to know where to start. Harry Schechter, founder and CEO of Temperature@lert (866/524-3540; www.temperaturealert.com), says ease of use and reliability are the two most important features to look for. "Choose a product that provides just the features you need, and this will ensure you're getting something that will be intuitive to set up," he says.

When it comes to connecting monitoring equipment to the network so that it can send alerts, several options exist, Schechter says. USB, Wi-Fi, and Ethernet remain popular, but there are also newer infrastructure-independent devices based on cellular phone connections.

✔ Install & Monitor

An environmental monitoring system is nothing without notifications. "The primary motivation for adding an environmental monitoring system is to know when you have a problem as soon as possible," says Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com). Common notification options include email, LEDs, audible alarms, beacons, sirens, Web alerts, SNMP, automated phone calls, and SMS.

To avoid false alarms, let the monitor run for a few hours after installation so you can see the natural cycle of temperature and other sensors, Schechter says. Once you have a chance to review what a "normal" reading looks like, you can set an appropriate high/low threshold.

✔ Ensure Ample Coverage

Consider the room size and amount of equipment to be monitored and plan the number and placement of sensors accordingly. "If your deployment is small, a few points of measurement may suffice, but if you have a large operation, you may require environmental measurements every few feet," says Brandon Siri, senior marketing representative at Server Technology (800/835-1515; www.servertech.com).

✔ Get All You Need

Be sure you get all the components to complete the system, Viars says. "Most systems have a main console, and in addition to that, you'll need to purchase various sensors based on what you are looking to monitor specifically." Some sensors might require a power source, so consider that when planning your layout.

Sigourney adds that the best solutions include software. "This prevents wasted time trying to get hardware and software from two vendors working together."

✔ Consider Long-Term Support

Choosing the right solution means little if you don't have long-term support, Sigourney says. "Look beyond the checklist and make sure that you're getting future enhancements, that you have access to support, and that the company stands behind its products." P

Buyers' Checklist

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com) offers this list of important features to look for:

- ✔ What conditions can be monitored (temperature, humidity, power, etc.)?
- ✔ Are the sensors wireless or wired? How they will be installed?
- ✔ What kind of reporting is available from the system? Can data be stored and exported for trending and analysis?
- ✔ What types of alerts and notifications can the system produce?
- ✔ How easy is it to configure and operate the system?

Key Terms

dry contact
Refers to an electrical contact that has no internally available voltage.

gateway
Receives information from sensors and can provide alarm/alerting functions.

sensors
The wired or wireless devices that measure and report environmental conditions to the gateway.

Buying Tips:

Storage

You spend a lot of money on storage, and you need to make sure every dollar you spend is a good investment. With so many options available, including cloud, in-house, or some combination of both, it's more important that ever to have a solid understanding of what's available and what's most important for your enterprise.

✔ Do Your Homework & Know Your Goals

When narrowing your storage options, careful research is invaluable. "Do your homework, but don't over-analyze," says George Crump, senior analyst at Storage Switzerland. Crump suggests discussing your project with one systems vendor, one new-but-established vendor focused on the mid-range, and one startup.

Crump says you should have a clear goal. "Do [you] need more capacity, more performance, better data protection, [or] some or all of the above?," he asks. Be clear about your company's business requirements, business strategy, and networking strategy, including bandwidth requirements and available facilities and services.

Greg Schulz, senior advisor at Server and StorageIO, recommends stepping back from comparing tools and technologies initially and instead reviewing service-level objectives and requirements, including RTO and RPO. Also be sure to give serious thought to how much of the new storage could be in the cloud, whether public (third-party) or private (in-house).

✔ Inventory Your Data

Have a clear understanding of your data and requirements. Inventory the type of data you have today—how much is in databases, email, files, and other formats. Crump says a good set of storage analysis tools can help you evaluate how you're currently using your IT resources.

✔ Spend What's Needed

Storage can be expensive, but you get what you pay for. "While everyone wants to spend pennies to save dollars, real data protection may cost dimes, not pennies—but you'll still be saving dollars," says Jason Buffington, senior analyst with Enterprise Strategy Group.

Often, management may underestimate the financial impact downtime or lost data has until it's too late, he says. "In today's market, that may mean losing a key client or potentially being unable keep the doors open just because you can't get your data back," he says.

✔ Consider Outsourcing Storage Management

Mike Karp, vice president and principal analyst at Ptak, Noel, and Associates, says for small to midsized enterprises, most often the best option is outsourcing storage management, particularly where getting the most out of your storage and doing it with the greatest efficiency is concerned.

"Third-party providers often have a huge competitive advantage when it comes to providing storage services, and if an IT manager can make a good business case for outsourcing many of the storage responsibilities . . . they can spend more time doing the things that they do best and offload the things that they can't do with greater efficiency to somebody who can do them in a cost-effective manner." P

Buyers' Checklist

Here are some things to keep in mind as you formulate your storage strategy:

- ✔ **Data safety.** Keeping your precious data safe is vital to profitability, so be sure to implement redundancy and strong error correction, as applicable.
- ✔ **Uptime.** You need reliable devices and software, along with failover protection (both emergency power and redundant data storage systems). You'll also need support from the vendors, relevant manufacturers, and/or developers.
- ✔ **Security.** Consider all elements, including user access policy, encryption, firewalling, and malware prevention.
- ✔ **Speed.** How fast your storage works is important. SSDs will have a role in most data centers.
- ✔ **Manageability.** Your organization may require new software for storage management, data protection, support, and future storage planning.
- ✔ **Cost-effectiveness.** Think not only in terms of cost per gigabyte, but also cost per IOPS. Deduplication, virtualization, and provisioning features can help you avoid wasting money and power on unnecessary drives.
- ✔ **Scalability.** Whichever path you take, make sure the result will let your data center grow with your organization's needs.

Key Terms

cloud storage
Storage that takes advantage of offsite, third-party providers that maintain and manage the physical storage devices.

solid-state drive (SSD)
Data storage with no moving parts; it uses solid-state memory, or microchips, to store data, making data retrieval faster.

Buying Tips:

Used Equipment

When you're in the market for used equipment, knowing what to look for and whom to buy from can be challenging. Here are some tips to help.

✔ Understand The Testing Process

When a vendor purchases used equipment for resale, a visual inspection and diagnostics test are usually the first steps in the testing process. Technicians ensure that components are complete, that they're operating at the original specifications, and that everything is current and in proper working order. But successfully getting through the diagnostics phase doesn't mean that a piece of equipment is home free. Other factors can still move items from the refurbish line to the recycle heap. Used and refurbished equipment dealers look for problems such as cosmetic repairs that require too much time to fix or signs of pending equipment failure or tampering.

As a buyer, where applicable, you'll want to be sure the equipment you're buying has been tested and updated with any new BIOS or firmware levels. And whether you're buying equipment from someone else or selling your own, make sure the data has been wiped clean to avoid security breaches and data loss.

✔ Spot The Signs Of Possible Counterfeit Equipment

Hardware is at risk for counterfeiting, especially equipment with recognizable, higher-margin brand names. Counterfeiters don't mind investing more money into making good fakes, and, unfortunately, it's not always easy to spot these fakes. If equipment is in its original packaging, pay attention to the quality. As always, know who you're dealing with and research the reputation of the company you're buying from, then be sure you know the recourses available should you discover something is counterfeit.

✔ Pay Attention To Part Numbers

Savvy buyers of used and refurbished equipment check part numbers ahead of time, because you don't want to receive equipment that's close to—but not exactly—what you thought you were getting. Check to make sure that components carry only original part numbers, so you know exactly what you're buying.

✔ Know The Warranty & Return Policies

Knowing how a supplier handles equipment returns is an important factor in any purchase decision. Warranties are only as good as the company offering them, so do your homework. Reputable companies provide faster turnaround on advance replacement exchanges, they may waive restocking fees, and they offer better support options.

Also, find out if you'll need to hold on to the original packing material until your warranty period expires. Some suppliers won't accept returns unless they're in the original packaging, while others are less picky. Customers should ask about the requirements when making their purchase so that a return isn't refused because someone inadvertently pitched the original box.

Even if a supplier accepts your returned equipment, you might not get your money back and instead will get a return for credit. If your equipment purchases are infrequent, your money could be tied up until you find something else you need to buy.

✔ Ask Your Vendor For A Trial Period

Inspecting equipment before you buy it can be difficult, but you may be able to swing a brief trial period. Be sure to test and inspect the components and contact the vendor if you find any defects.

The payment method you choose could also offer safeguards, such as the dispute resolution available through most credit card companies. Depending on your company's buying position and relationship with the vendor, you may also be able to get a sample piece of equipment. This is often a good route for data centers looking for multiple identical components or considering a shift to a new manufacturer or platform. P

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From *Processor*'s home page (www.processor.com), you can search for a specific part number, make, model, or description. Enter the information in the appropriate box and click Search. You'll see a list of available equipment. If you don't see the particular piece you're looking for, scroll to the bottom of the search results page to conduct a more detailed search. There, you can search by part number, model, price, location, and more.

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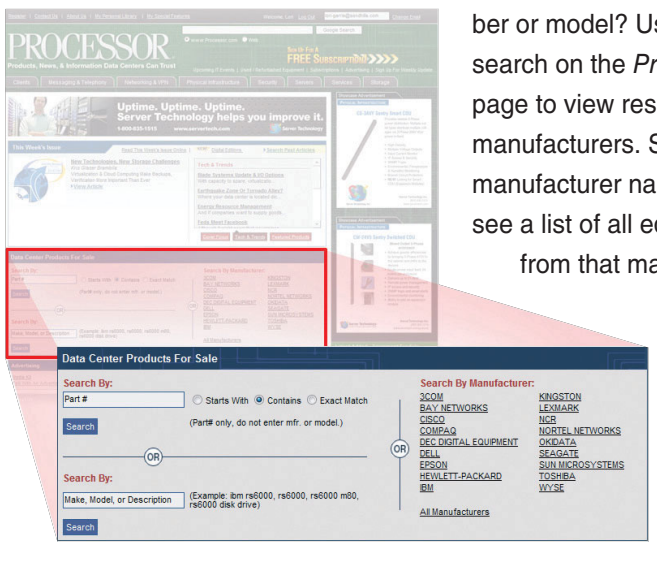

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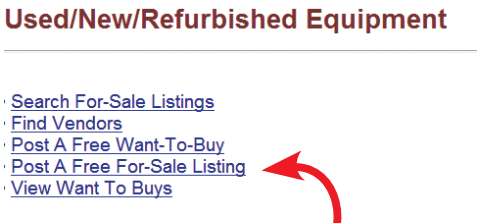
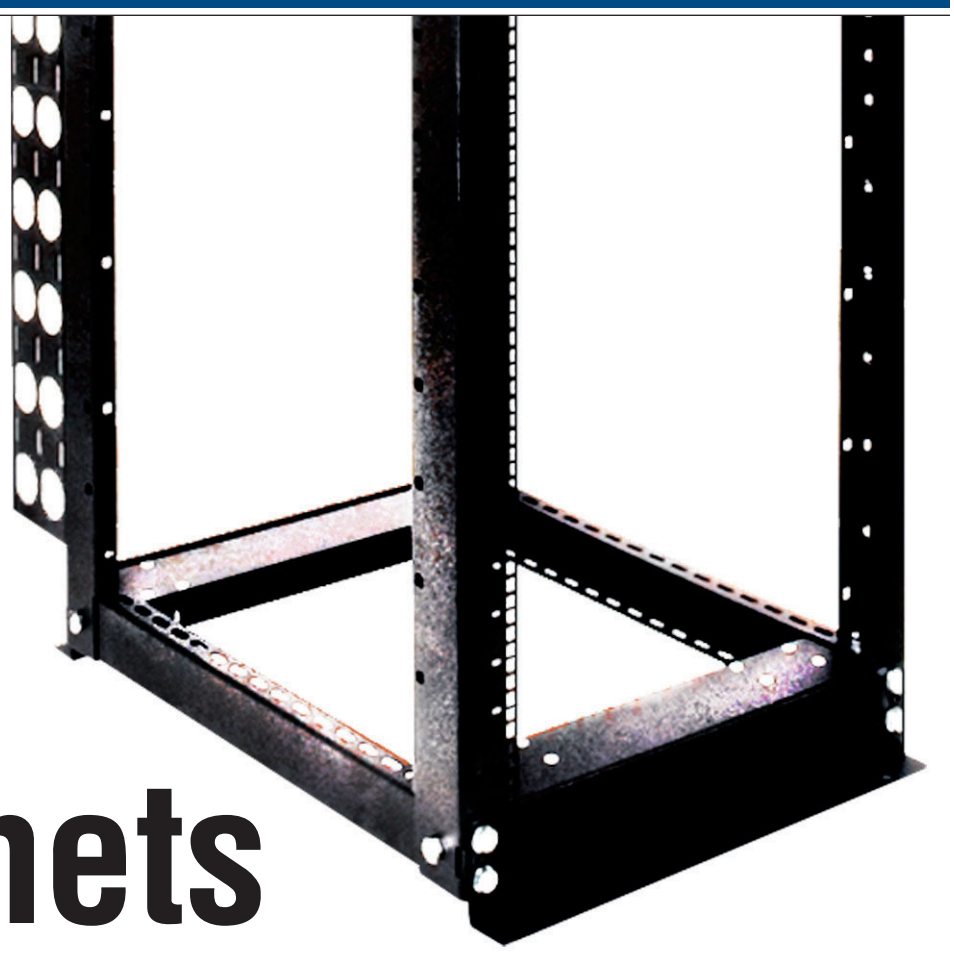


Follow the on-screen directions from there!



Buying Tips:

Data Center Racks & Cabinets

Racks and cabinets hold and protect every piece of equipment that runs your data center, so don't rush the decision about which cabinet to purchase. Instead, focus on the most important features and ensure the cabinet will fulfill your needs for years to come.

✔ Know What's On The Market

Start by researching what's on the market. There are full-sized, midsized, and smaller cabinets as well as racks with heights of 30 to 84 inches and widths of 24 to 36 inches.

Eli E. Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com), says to look for potential add-on items, such as overhead storage compartments, power and cable management solutions, and back and side panels. Different sized racks and cabinets paired with additional solutions can help you design a product that's perfect for your data center.

✔ Pinpoint Your Needs

"Establish what you need the cabinet to do," says Susan Wynne, senior sourcing specialist for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "If the equipment is noisy, you may want a sound reduction cabinet. If the environment is dirty, you may need a filtered cabinet. Even the area of the country is important, and you may need an air-conditioned or NEBS cabinet."

Other considerations include whether you have a sprinkler-based fire suppression system that requires NEMA 12 certified cabinets that keep out moisture, Wynne says. You should also consider built-in security measures, such as locked cages or other alternatives, if there is a lot of traffic into and out of your data center.

✔ Pay Attention To TCO

Don't treat racks and cabinets like a commodity, says Carrie Higbie, global director of data center solutions and services at Siemon (860/945-4200; www.siemon.com).

"Some companies get commodity-grade cabinets 'free' or at a reduced cost as part of other purchases, and while this may sound attractive up-front, sometimes you get exactly what you pay for." The commodity cabinet may be less expensive than a full-featured cabinet, she says, but the TCO often changes when you have to spend time troubleshooting the commodity cabinet or making costly adjustments to support the cable plant.

✔ Research The Vendor

The decision of which vendor to buy from is significant, Hertz says. Companies should be able to "grill the supplier on what they are actually going to be getting." The vendor should know "the product from nuts to bolts."

✔ Get The Right Fit

In most cases, you've decided which pieces of equipment to buy for your data center before you start shopping for the racks and cabinets to store them in. It's a great opportunity to measure each piece and come up with a mock configuration for how it will fit into the rack or cabinet. "This ensures the cabinet is tall enough, wide enough, and deep enough to handle the longest piece of equipment to be populated into the cabinet," Wynne says.

But be careful you don't populate the racks or cabinets with more equipment than you can reasonably concentrate in one area, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). A higher density of equipment creates more heat and possible hot spots. "Make sure your cooling equipment can adequately cool the equipment before you put it all in one spot."

The amount of space the rack or cabinet takes up is equally important. "Make sure the outside dimensions of the cabinet will fit in the designated location," Wynne says. Leave adequate space for future expansion. If you don't, you could get stuck with a cramped and inefficient data center with no room for evolution.

✔ Check For Airflow

If you are utilizing raised floors and CRAC units, having vents or grills to allow airflow through the structure is essential, Koty says. "Look for server cabinets that provide good ventilation. Make sure that the cabinets draw cold air from the front and discharge in the back to enable a hot/cold-aisle configuration."

Higbie says many companies are getting away from smaller 24-inch cabinets in favor of wider cabinets with better pathways for cabling and more capabilities for airflow.

To ensure the cabinet has adequate airflow, she says, you'll need to know the power needed for each cabinet to help decide the amount of equipment that will go in that cabinet. P

Buyers' Checklist

- ✔ Is cable management built-in, or does the rack or cabinet leave adequate space to neatly route cables?
- ✔ Does the rack/cabinet provide PDU mounting options such as brackets?
- ✔ Does the equipment you're mounting require tapped or M6 holes?
- ✔ Will you need to disassemble the rack/cabinet to get it in the room?
- ✔ Is the cabinet lockable to prevent potential security issues?

Key Terms

M6 holes
Square holes common with rackmount equipment and server cabinets; they can be adjusted to a round hole with a cage nut.

rackmount unit (RMU)
Cabinets and racks are measured in rackmount units, with each RMU, or U, equivalent to 1.75 inches.

PROCESSOR

Network With Your Peers At These IT Training & Association Meetings Across The United States

JULY

ISSA Inland Empire
July 30, 11:30 a.m. to 1:30 p.m.
Upland, Calif.
ie.issa.org

AUGUST

AITP Washington, D.C.
Aug. 8
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

SharePoint TechCon
Aug. 11-14
Boston, Mass.
www.bigdatatechcon.com

Implementing Cisco IOS Network Security
Aug. 12-16
New Horizons Washington, D.C.
1331 F St. N.W., Suite 240
Washington, D.C.
www.dcnewhorizons.com

AITP Richmond
Aug. 13
Hilton Garden Inn at Innsbrook
4050 Cox Road
Glen Allen, Va.
www.aitprich.org

AITP Wheeling
Aug. 14
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

AITP Twin City
Aug. 15, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

AITP Southwest Missouri
Aug. 20
High Street Baptist Church
900 N. Eastgate Ave.
Springfield, Mo.
aitpspringfield.org/main.html

Cisco CCN Certification Training Course
Aug. 21
Institute of Professional Learning
500 W. Cypress Creek Road
Ft. Lauderdale, Fla.
www.iplearning.net

ISSA Inland Empire
Aug. 27, 11:30 a.m. to 1:30 p.m.
Upland, Calif.
ie.issa.org

ISSA Baltimore
Aug. 28
Concurrent Technologies Corp.
8530 Corridor Road
Savage, Md.
www.issa-balt.org

SEPTEMBER

AITP Richmond
Sept. 10
Hilton Garden Inn at Innsbrook
4050 Cox Road
Glen Allen, Va.
www.aitprich.org

AITP Wheeling
Sept. 11
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

AFCOM Potomac
Sept. 12
Augustine Golf Club
76 Monument Drive
Stafford, Va.
www.afcom.com

AITP Washington, D.C.
Sept. 12
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

Upcoming IT Events

BICSI Fall Conference

Sept. 15-19

MGM Grand Hotel

3799 Las Vegas Blvd.

Las Vegas, Nev.

www.bicsi.org

CompTIA Network Certification

Sept. 16

New Horizons Lexington

1050 Chinoe Road, Suite 208

Lexington, Ky.

www.nhlexington.com

AFCOM Greater Tampa Bay Chapter

Sept. 18, 12:30 to 4 p.m.

www.tampabayafcom.com

AITP Northeastern Wisconsin

Sept. 18

Holiday Inn Appleton

105 S. Nicolet Road

Appleton, Wis.

new.aitp.org/eventsmeeting-info

AITP Twin City

Sept. 19, 7 p.m.

Ozark House Restaurant

704 McGregor St.

Bloomington, Ill.

www.aitp.org/members/group_content_view

.asp?group=75779&id=125369

Cisco CCNP Security Certification Training Course

Sept. 21

Institute of Professional Learning

500 W. Cypress Creek Road

Ft. Lauderdale, Fla.

www.iplearning.net

AITP Akron

Sept. 24

Akron, Ohio

www.akron-aitp.org

ISSA Inland Empire

Sept. 24, 6:30 to 8:30 p.m.

Upland, Calif.

ie.issa.org

AITP California Southland

Sept. 25

Garden Grove, Calif.

www.aitpcalsouthland.org

ISSA Baltimore

Sept. 25

Concurrent Technologies Corp.

8530 Corridor Road

Savage, Md.

www.issa-balt.org

Data Center World

Sept. 29-Oct. 2

Orlando World Center Marriott

Orlando, Fla.

www.datacenterworld.com

Deploying Windows Server 2008

Sept. 30

New Horizons Tysons Corner

2010 Corporate Ridge, Suite 200

McLean, Va.

www.dcnewhorizons.com

Interop

Sept. 30-Oct. 4

Javits Center

New York, N.Y.

www.interop.com

OCTOBER

AITP Wheeling

Oct. 9

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

AITP Fall Region 5 Conference

Oct. 10 (Early bird registration ends Aug. 31)

The Chateau

1601 Jumer Drive

Bloomington, Ill.

www.aitp.org/group/905

AITP Region 5 Leadership Workshop

Oct. 11 (Early bird registration ends Aug. 31)

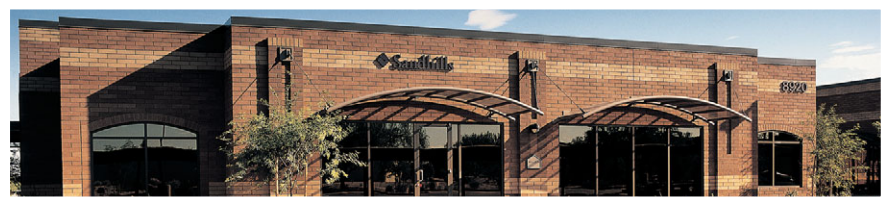
The Chateau

1601 Jumer Drive

Bloomington, Ill.

www.aitp.org/group/905

Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.



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Founded in 1978, Sandhills Publishing is an information processing company with a diverse range of products covering a variety of industries. Sandhills Publishing is located in Lincoln, the capital of Nebraska, and benefits from the quality of life and strong work ethic traditionally associated with the Midwest.

Sandhills Publishing®

Processor Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

To list your company and products, call (800) 247-4880.

Physical Infrastructure

CORNING

Corning Cable Systems is a leading manufacturer of fiber optic communications solutions for voice, data and video network applications worldwide. We offer the broadest range of end-to-end connectivity solutions for customers' telecommunications networks. We put companies at the forefront of network innovation, pioneering many of the global products and solutions commonly used in state-of-the-art cabling systems.

Products Sold:

- Cabling

(607) 974-9000 I www.corning.com

Physical Infrastructure

PDUs direct

PDUsDirect.com is a Master Distributor of select Server Technology PDUs for server and networked environments. PDUs Direct's basic, metered, and switched Rack PDUs provide local and remote power management, power monitoring, and environmental monitoring. We pride ourselves in offering industrial-grade quality products at the lowest prices, with the fastest shipping (most orders shipped within 24 hours) and simplest purchase process. We are the Power Behind the Business.

Products Sold:

A complete line of metered and basic PDUs, and 20A switched PDUs.

(888) 751-7387 I pdusdirect.com

Physical Infrastructure

AVTECH

AVTECH Software, founded in 1988, is focused on making the monitoring and management of systems, servers, networks, and data center environments easier. AVTECH provides powerful, easy-to-use software and hardware that saves organizations time and money while improving operational efficiency and preparedness. AVTECH products use advanced alerting technologies to communicate critical status information and can perform automatic corrective actions.

Products Sold:

A full range of products that monitor the IT and facilities environment, including temperature, humidity, power, flood, room entry, and UPS

(888) 220-6700 I www.AVTECH.com

Physical Infrastructure

DATA AIRE INC.

Data Aire, Inc. has been designing and manufacturing precision cooling equipment for more than 40 years. We established some of today's industry standards, such as scroll compressors, steam generator humidifiers and microprocessor controllers. Our equipment can be found in any size organization or data center, from a closet to a Fortune 500 financial data center or government high security operation center. With our experience and expertise we can, and are willing, to design and build equipment to meet our customer's needs. With the shortest delivery times in the industry Data Aire can meet your requirements.

Products Available:

- Floor Mounted Units – CRAC or CRAH
- Ceiling Mounted Units
- Rack and Row Solutions
- Specialty Units
- Heat Exchangers
- System Controls

(800) 347-2473 | www.dataaire.com

Physical Infrastructure

Server Technology
Quality Rack Power Solutions

Server Technology is committed to the PDU market with the largest group of engineers dedicated to power distribution and other solutions within the equipment cabinet. Advancements in device power monitoring help data centers monitor and improve their efficiency, and continuous research and development is fueled by companies that look to Server Technology for their custom cabinet power solutions.

Products Sold:

A complete line of cabinet PDUs, including Per Outlet Power Sensing (POPS), Rack Mount Fail-Safe Transfer Switch, Console Port access with remote power management, Switched, Smart, Metered, Basic, and -48 VDC

(800) 835-1515 I www.servertech.com

Physical Infrastructure

Raritan®
Know more. Manage smarter.™

Founded in 1985, Raritan has become a leading provider of power and energy management, DCIM and KVM solutions. Our products are in use at more than 50,000 locations worldwide, including eBay, Cisco, Intel, NASA, and the United States Post Office, giving IT departments the tools they need to increase power management efficiency, better manage data center changes, improve data center productivity and enhance branch office operations.

Products Sold:

- Intelligent Rack Power Distribution Units
- Energy Management Software
- Data Center Infrastructure Management
- KVM and Remote Access Management

(732) 764-8886 I www.raritan.com

Physical Infrastructure

spot coolers
Portable Air Conditioning with Confidence

Since 1985, Spot Coolers has specialized in portable cooling and heating units for use in data centers, commercial office buildings, hospitals, schools, factories, and warehouses. As a United Technologies Company, Spot Coolers takes Responsibility for Ethics, Safety, Security and Protecting the Environment. With more than 5,000 portable cooling and heating units at our 38 locations nationwide, you can be sure that our delivery and installation staff are reliable and dependable: people you can trust!

Rentals & Sales of:

- Air-cooled and water-cooled air conditioning units
- Heat pumps
- Ceiling-mounted cooling units
- Trailer-mounted cooling units

800.367.8675 I www.spot-coolers.com

Physical Infrastructure

Atlas Sales & Rentals, Inc.
THE PORTABLE COOLING & HEATING SPECIALISTS

Atlas has specialized in portable air conditioning since 1979 and leads the industry in server room and data center portable cooling. We offer "24/7" response from company-owned, full-service offices around the country, each stocked with a wide inventory of equipment for primary, supplemental, or emergency cooling. All portable items are available for sale or rental. Atlas is a Preferred MovinCool® Distributor and a GSA Certified MAS Contractor.

Products Sold:

- 1-5 ton portable air conditioners, air and water-cooled
- 12-ton portable coolers designed to roll through a standard doorway
- Ceiling-mount air conditioners – full line of MovinCool® packaged a/c units

(800) 972-6600 I www.AtlasSales.com

Physical Infrastructure

hergo®
TECHNICAL WORKSPACE SOLUTIONS

Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Enclosures/cabinets
- Motorized workstations
- Flat-panel arms
- Computer desks
- Cable management
- Power management

(888) 222-7270 | www.hergo.com

Physical Infrastructure

LINDY®
CONNECTION PERFECTION

LINDY USA specializes in cables, adapters, electronics and accessories for computer, networking and audio video applications. Since 1932 Lindy has supplied high quality interconnects to customers in commercial, telecom and residential markets. What sets us apart is our complete dedication to innovation, performance and reliability. Our cabling products are truly outstanding.

Products Sold:

• Networking Products • Audio / Video • KVM • Sharing, Converting, Extending • USB and FireWire • Input Devices • Add-On Cards • Hardware and Security • Power • Cabless • Adapters and much more!

(888)-865-4639 | www.lindy-usa.com/

Physical Infrastructure

PDU Cables™
Innovator in data center efficiency

PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 I www.pducables.com

Physical Infrastructure

HM CRAGG
Quality People. Quality Power.

As an integrator and master distributor providing quality power solutions, HM Cragg has built a reputation as the company that delivers innovation to aid and satisfy its customers. HM Cragg was founded in 1968 and is 100% employee-owned, focusing on quality people and exceptional products.

Products Sold:

- AC and DC power solutions (UPSes, power distribution)
- Control and monitoring (environmental and power)
- Connectors and cables (cord sets, ePDU cables)
- Cooling (air flow management, portable cooling)
- Racks and enclosures (standard racks, battery racks)
- Safety equipment (spill containment, safety signs)

(800) 672-7244 | www.hmcragg.com

Physical Infrastructure

RACKMOUNT SOLUTIONS

Rackmount Solutions' mission is to listen to the IT engineer's specific needs and deliver superb-quality, high-performance products through continuous product innovation and operational excellence. We pride ourselves in providing quality customer service, products that fit your IT requirements, and solid value for your money.

Products Sold:

- Wallmount and server racks and cabinets, including sound proof, air conditioned, and large cable bundle
- Desktop/tabletop portable racks
- Shockmount shipping cases
- Bulk cable

(866) 207-6631 | www.rackmountsolutions.net

Physical Infrastructure

GEIST

Geist is a leading data center provider for power strips, monitoring equipment, cabinet containment & in-rack cooling, and DCiM systems. Geist's power strips are tailored to meet each client's needs and provide unbeatable performance in the data center. Our industry leading monitoring and cooling solutions increase data center efficiencies and make going green easier than ever before.

Products Sold:

- Power
- Cool
- Monitor
- Manage

(800) 432-3219 | www.geistglobal.com

Physical Infrastructure

CE COMM DATA CENTER PRODUCTS & SERVICES

C.E. Communication Services (CE COMM) distributes, markets, designs, and manufactures Data Center products, specializing in Network Infrastructure, Cable and Wire Management, and Fiber and Copper Cabling.

Products Sold:

- Patented Cable Management Systems for CISCO Catalyst and all 1U Switches
- Standard & Custom Data Center Cable Assemblies: Copper CAT5E, CAT6 & 6A
- High Density Optical Fiber Assemblies
- Fiber Connectivity, Fiber Test - Inspection and Media Conversion Equipment

(866) 966-1555 | www.cecommunication.com

Physical Infrastructure

Coolerado

Coolerado Corporation manufactures and markets innovative air conditioning systems for commercial, government, and military use. Based on our proprietary, patented, and proven technology our products use as little as 10% of the energy required by the most efficient conventional systems. Our products dramatically reduce customers' energy consumption, while creating a healthier environment by delivering 100% fresh air and flushing out stale air and pollutants. A single Coolerado unit can cool 3,000 sq/ft of building space, using as little as 1/3 the power of a standard hand-held hair dryer.

Products Sold:

- M30, M50, C60, and other custom HMX solutions.

www.coolerado.com/processor

Physical Infrastructure

SIEMON

Headquartered in Connecticut, Siemon has been around since 1903 as a provider of high-quality cabling solutions designed to improve network connections, performance, and efficiency. The company manufactures end-to-end copper and fiber cabling systems, cabinets, racks and cable management solutions for data centers, and more. Siemon also has an R&D arm, Siemon Labs, which focuses heavily on innovation and shows the company's long-term commitment to its customers.

Products Sold:

- Cable management solutions
- Data center cabinets and racks
- End-to-end copper and fiber cabling
- High-speed interconnects
- Intelligent infrastructure management

(860) 945-4200 | www.siemon.com

Physical Infrastructure

AUSTIN HUGHES

Founded in 1995, Austin Hughes Electronics Ltd is a design and manufacturing group that offers a broad range of solutions based around 19 inch rack mount technology. With a wealth of experience Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handels
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

Physical Infrastructure

BayTech

BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

Physical Infrastructure

SENSAPHONE® REMOTE MONITORING SOLUTIONS

Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Penn.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

Physical Infrastructure

Rack Solutions®

RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

Computer server racks, cabinets, shelves, and mounting products.

(888) 903-7225 | www.racksolutions.com

Physical Infrastructure

AMERICOOL AIR CONDITIONING

AmeriCool, Inc. is the official sales, marketing, and distribution company for Weltem Air Conditioning products in North America. Our AmeriCool portable air conditioners are built to the highest standards in the industry and offer unbeatable performance, reliability and value. With products ranging from 1 to 5 tons we offer air conditioning solutions to companies small and large. Due to the wide operating range of our product, 24/7 cooling capability and rugged design, our product is a great solution for mission critical needs and harsh industrial applications.

Products Sold:

- Portable Air Conditioning Units

(800) 680-0725 | www.americoolinc.com

Physical Infrastructure

SIMPLEX™ ISOLATION SYSTEMS

Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Enclosures
- Strip doors
- Curtains

(877) 746-7540 | www.simplexisolationsystems.com

Networking & VPN

Interface Masters Technologies
Innovative Network Solutions

Interface Masters Technologies is a leading vendor in network monitoring and high-speed networking. Based in the heart of the Silicon Valley, Interface Masters' expertise is in Gigabit, 10 Gigabit, and 40 Gigabit Ethernet network access and network connectivity solutions that integrate with monitoring systems, inline networking appliances, IPS, UTM, load balancing, WAN acceleration, and other mission-critical IT and security appliances.

Products Sold:

- Hardware load balancers
- Specialized 10GbE internal server adapter cards
- Bypass and failover systems

(408) 441-9341 I www.interfacemasters.com

Networking & VPN

Metric Systems Corporation

Metric Systems Corporation® designs and manufactures broadband wireless networking equipment, and end-to-end solutions for government and industry. We've been in the business of manufacturing and integrating reliable industrial-grade wireless networking systems for over 25 years. Our networks are deployed around the world protecting and supporting people and machines. Our specialty is working with your unique requirements and existing infrastructure to provide a networking solution that fits your requirements, schedule, and budget.

Products Sold:

Rhino Box® Environmentally Controlled Equipment Shelters and SAFARI™ Wireless Controllers and Radio Systems.

(800) 549-7421 I www.metricsystems.com

Storage

TOLIS Group™

TOLIS Group, Inc., is a privately held corporation headquartered in Scottsdale, Arizona. The singular focus of TOLIS Group™ is the development and support of ultra-reliable data backup and restore solutions for end-users and OEMs based on TOLIS Group's proven BRU™ technology. All solutions are based on TOLIS Group's proven BRU technology - the only backup tool that properly recovers from media read errors during a restore process to return the most data possible.

Products Sold:

BRU Server software and hardware bundles — everything you need in one convenient bundle to protect your data.

(480) 505-0488 I www.tolisgroup.com

Security

Barracuda

Barracuda Networks, Inc. offers industry-leading solutions designed to solve mainstream IT problems – efficiently and cost effectively – while maintaining a level of customer support and satisfaction second to none.

Products Sold:

- SECURITY: Advanced security for email, web, application and network threats
- STORAGE: Protect critical data while achieving regulation and litigation compliance
- APPLICATION DELIVERY: Improve application performance and employee productivity

(888) 268-4772 I barracuda.com

Servers

ServerMonkey.com

ServerMonkey stocks and delivers new and refurbished servers and networking equipment. Our blend of low prices, high quality and exceptional service offers a unique opportunity for corporate IT groups to economize without compromising.

Products Sold:

- Dell, HP, and other Servers
- Workstations
- Storage
- Processors
- Server Accessories

(713) 430-2182 I www.servermonkey.com

Servers

CHENBRO

Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 I www.chenbro.com

Servers

SUPERMICRO®

Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology, is a premier provider of advanced server Building Block Solutions® for enterprise IT, data center, cloud computing, HPC, and embedded systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative by providing customers with the most energy-efficient, environmentally-friendly solutions available on the market.

Products Sold:

- Servers
- Motherboards
- Chassis
- Network switches
- Storage solutions
- Blade servers
- GPU servers
- Embedded

(408) 503-8000 I www.supermicro.com

Clients

dtSearch® www.dtsearch.com

The Smart Choice for Text Retrieval® since 1991, dtSearch® offers over 21 years of experience in parsing and searching data. The dtSearch product line includes enterprise and developer text search products, meeting some of the largest-capacity text retrieval needs in the world. dtSearch's website offers hundreds of developer case studies and press reviews. The company has distributors worldwide, including coverage in six continents.

Products Licensed:

Text retrieval products, including:

- Desktop with Spider
- Network with Spider
- Publish (for portable media)
- Web with Spider
- Engine for Win & .NET
- Engine for Linux

(800) IT-FINDS I www.dtsearch.com

Services

FMI Recycling

FMI Recycling has been a leader in environmental responsibility for more than 28 years. They specialize in recycling end-of-life products, electronic equipment, scrap metals, and all types of industrial equipment. They pride themselves on their tradition of excellent customer service, knowledge and expertise, logistics capabilities, and community involvement and support.

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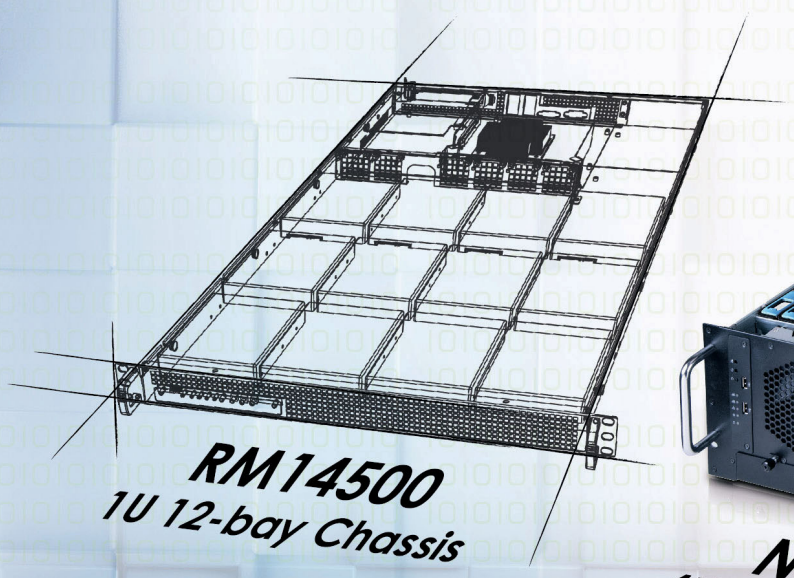
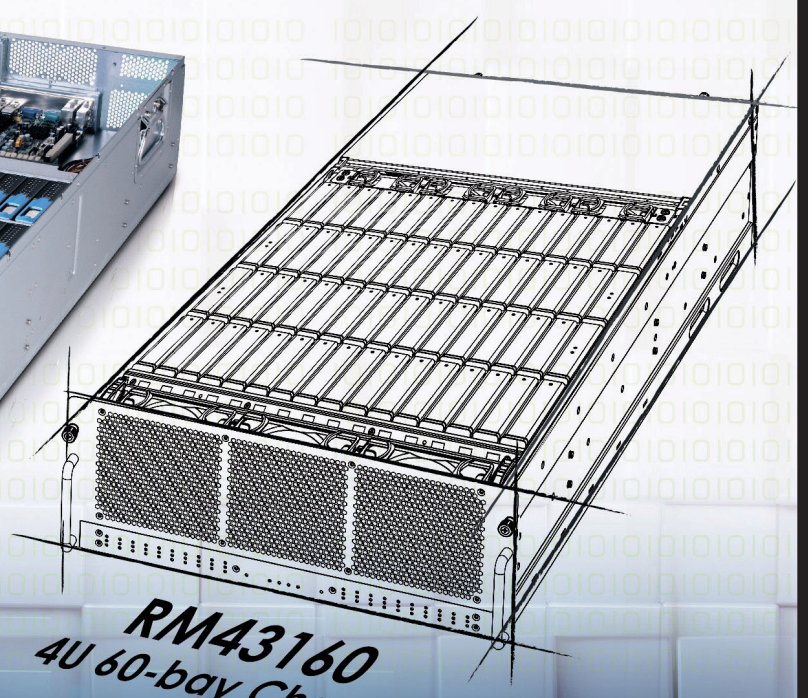


RM14500
1U 12-bay Chassis

NR40700
4U 48-bay Chassis

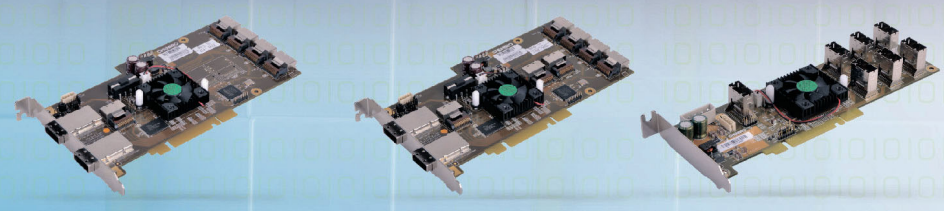


RM43160
4U 60-bay Chassis

High Density
Custom Solution

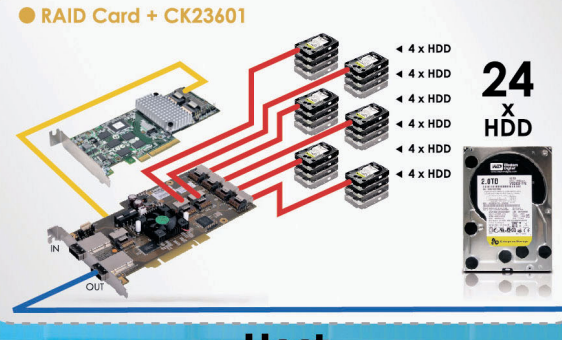
High Density Storage
Server Chassis

SAS Expander Card
High Capacity

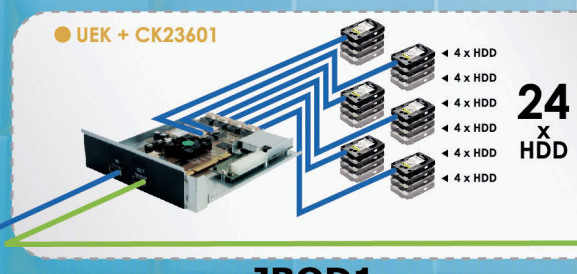


CK22803 CK23601 CK22804

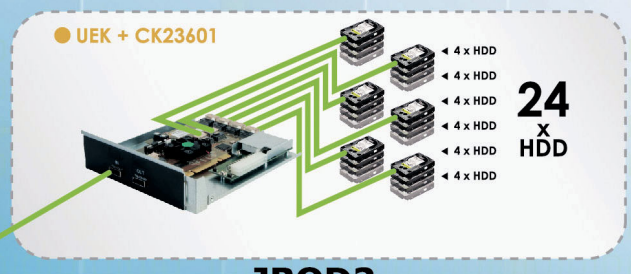
CK23601
6Gb/s 36-port SAS Expander Card



Host



JBOD1



JBOD2

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